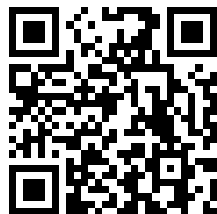
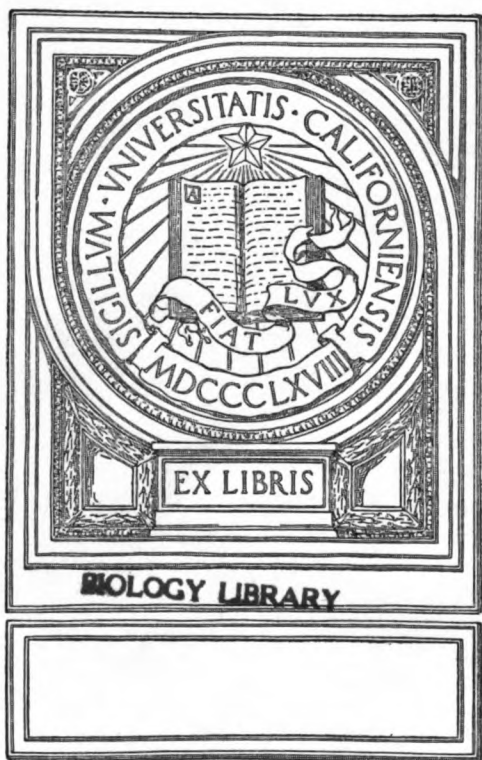
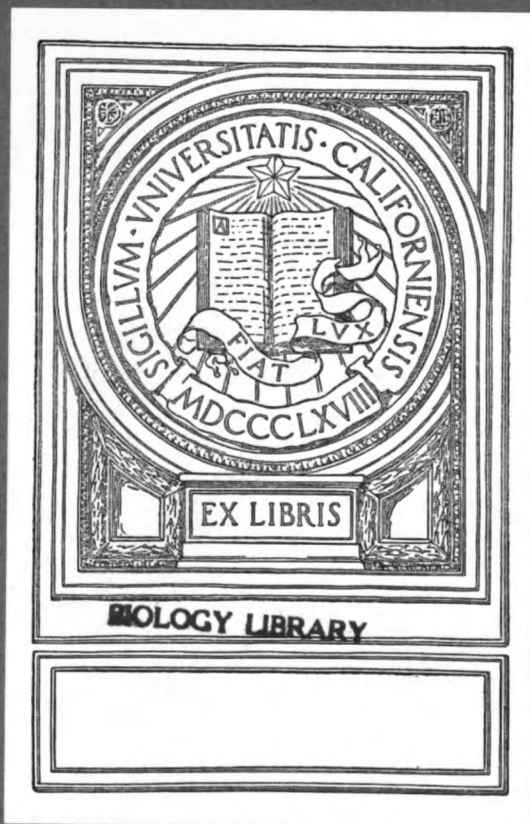

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Journal
of the
Royal Army Medical Corps

Journal

OF THE

Royal Army Medical Corps

EDITED BY

COLONEL S. LYLE CUMMINS, *C.B., C.M.G.*

ASSISTANT EDITOR :

LIEUTENANT-COLONEL P. J. L. CAPON, R.A.M.C.

MANAGER :

LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

VOL. LXXXII.

January—June, 1944.



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January, 1944.

Vol. LXXXII.

No. 1.

Journal

OF THE

Royal Army Medical Corps



ISSUED

MONTHLY

Stub 83:6
82-83
1944

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Journal of the Royal Army Medical Corps.

VISIT TO THE DEPOT OF OUR COLONEL-IN-CHIEF, HER MAJESTY THE QUEEN.

On Friday, December 10, 1943, the Depot was honoured by a visit from our Colonel-in-Chief, Her Majesty The Queen. The primary object of the visit was to see the repatriated personnel who are at present in the depot undergoing a rehabilitation course. The time and date of the visit were, of necessity, kept a secret and only a very few members of the staff were aware of what was afoot.

At half-past twelve Her Majesty arrived, accompanied by the Lady in Waiting, The Lady Katharine Seymour, and her Private Secretary, Major Penn, Grenadier Guards. The buglers sounded the Royal Salute and Her Majesty's personal standard was broken at the masthead outside the orderly room. One's first impression was how well the Queen looked and we all felt very proud that she was wearing the Corps badge in her hat. This badge was presented to the Queen by the Corps on her consenting to assume the appointment of Colonel-in-Chief.

Major-General H. P. W. Barrow, *C.B.*, *C.M.G.*, *D.S.O.*, *O.B.E.*, our representative Colonel Commandant, welcomed The Queen to our depot. He then introduced the following officers who were in attendance on that day :—

Lieutenant-General Sir Alexander Hood, *K.C.B.*, *C.B.E.*, *M.D.*, *K.H.P.*,
Director-General, Army Medical Services.

Major-General R. Evans, *C.B.*, *M.C.*

Major-General O. W. McSheehy, *C.B.*, *D.S.O.*, *O.B.E.*, *M.B.*, *K.H.S.*

Colonel C. D. K. Seaver.

Colonel D. C. Scott, *O.B.E.*, Commandant of the Depot.

Colonel D. C. Scott now took over from Major-General H. P. W. Barrow and introduced the following members of the depot staff :—

Captain D. R. Hood, Adjutant.

Captain J. W. Creamer, Commanding the Company of R.A.M.C. protected personnel.

Captain T. J. Daly, Commanding the Company of Non-R.A.M.C. protected personnel.

Serjeant-Major W. Crew, Depot Regimental Serjeant-Major.

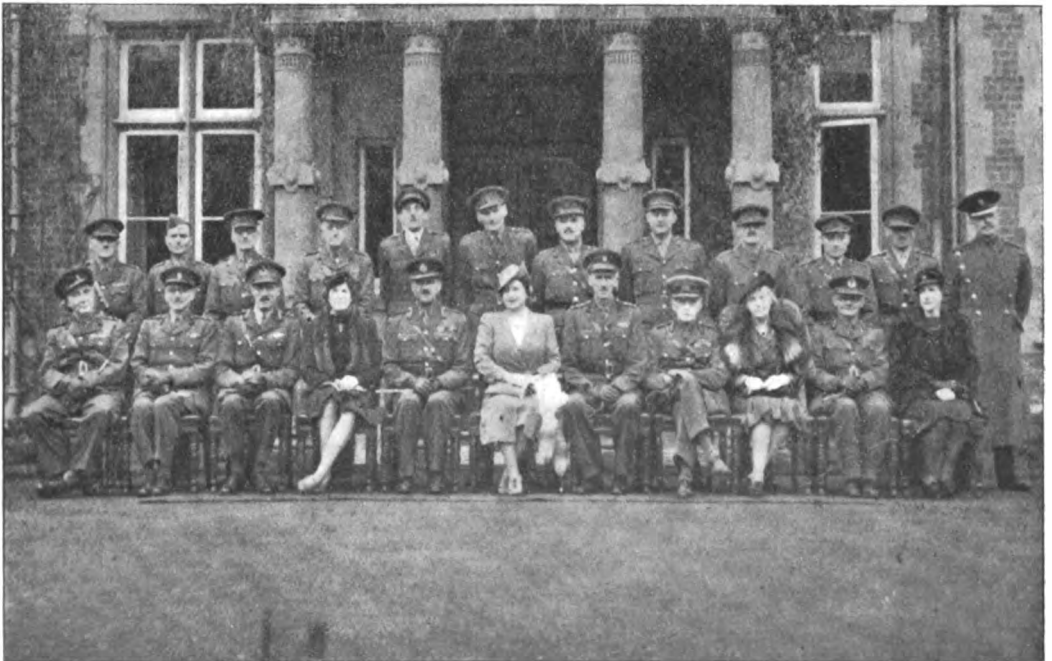
Colonel Scott, as Commandant, conducted The Queen to the Training Establishment, where various stages of recruit training were demonstrated. Lieutenant-Colonel G. P.



Her Majesty The Queen in conversation with one of the repatriated protected personnel.



Her Majesty The Queen talking to one of the enlisted boys, R.A.M.C.



Her Majesty The Queen with the Director-General Army Medical Services, the Commandant of the Depot and a group of officers.

Crowden, *T.D.*, the Chief Instructor, was presented. From the Training Establishment the party proceeded to the Model Hut and thence to the Model Ward where a recruit squad was under instruction. Her Majesty spoke to several of the men and showed a keen interest in all aspects of the training. Before leaving for lunch a visit was paid to the barrack rooms occupied by the enlisted boys. Her Majesty was delighted at meeting them and spoke to every boy. That night the boys were very industrious, writing home telling of their great experience.

Lunch was served at Redfields. Before lunch the following were presented to Her Majesty :—Lady Hood, Mrs. Scott, Colonel G. A. D. Harvey, Majors J. A. Chapel and W. E. Tucker, Captains A. D. Aveling and P. A. Forsyth, repatriated officers from Germany, Lieutenant-Colonel W. B. F. Brennan, Captains E. T. Gilbert, *D.S.O.*, *O.B.E.*, and W. L. Petter, repatriated officers from Italy. Also presented were Lieutenant-Colonel R. M. Davies and Major S. Gallie, *M.B.E.* Mr. Mudge, the Mess Steward, and his staff did nobly and the luncheon was a great success.

The programme after lunch was planned to allow Her Majesty an opportunity to talk to the repatriated personnel. The party moved off from Redfields about 2.30 and drove straight on to the Depot Square, where the Pipe Band played a Royal Salute. A word about the Pipe Band may not be amiss. It is a bequest to us from our Depot at Leeds, a voluntary band and entirely unofficial. All the members have their ordinary duties to perform within the Depot. As our official band is at present overseas the Pipe Band has been a great boon to the Depot. Her Majesty was delighted to hear the pipes and during the afternoon expressed a desire to speak to the men. The first piper to whom Her Majesty spoke was a man from the Hebrides with an accent in keeping. Her Majesty was intrigued and learned that he had played the pipes all his life.

Her Majesty then entered the first gymnasium and here saw the repatriated personnel at recreational training. She slowly passed down the gymnasium, having a word here and there with the men. Two other gymnasia were visited in like manner. It was after leaving the gymnasium that Her Majesty inspected the Pipe Band.

The party now proceeded to one of the N.A.A.F.I.'s where a further number of repatriated personnel was collected. Once again Her Majesty spent a considerable time talking to the men and enquiring where their homes were. Just before leaving the building three cheers were called for Her Majesty by one of the N.C.O.'s and right heartily were they responded to.

It was now time to say goodbye, but Her Majesty had not yet finished. On the way to her car she spoke to some of the troops lining the pathway. Goodbyes were said and Her Majesty entered her car. Down a troop-lined road and headed by the Pipe Band playing "Heilan' Laddie" the car moved off. Outside the orderly room the Pipe Band broke off and an escort of motor cyclists took charge of the Royal Car.

The visit was over. Her Majesty's Personal Standard was struck. It had been a red letter day in the history of the Corps. One and all felt that Her Majesty had been most gracious in visiting us and that our Colonel-in-Chief was highly interested in all that she saw.

Original Communications.

CHRONIC MELIOIDOSIS: A CASE SHOWING BONE AND PULMONARY LESIONS.

BY MAJOR J. H. MAYER, M.B., B.S.Lond., F.R.C.S.,

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Orthopædic Specialist,

AND

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South African Medical Corps,

Pathologist.

(From an Imperial Military Hospital in South Africa.)

WHITMORE and Krishnaswami (1912) described a glanders-like disease of man occurring in Rangoon. It was named Melioidosis by Stanton and Fletcher (1925), who called the causative organism *B. whitmori*. This organism was assigned to the Pfeifferella group of bacteria by Topley and Wilson (1941), and is now known as *P. whitmori*.

Melioidosis occurs in Burma, Ceylon, French Indo-China, the Dutch East Indies, Malaya and Siam. Scott (1939) recorded 100 cases, most of which were acute. He expressed the view that the disease may be commoner than is generally appreciated, quoting Krishnaswami as having observed 200 cases in Rangoon alone. Alain and Delbove (1939) reported 2 further cases in young children.

Souchard (1932) classified the disease into three clinical types from an experience of 10 cases: (a) Fulminating, with choleraic symptoms, 2 cases; (b) Acute, with symptoms stimulating enteric, 6 cases; (c) Chronic, 2 cases, which are further referred to by Souchard and Ragiot (1933). Most recorded acute cases have proved rapidly fatal and, at autopsy, areas of lung consolidation consisting of small abscesses and abscesses or caseous deposits in the spleen, liver and kidneys were the commonest findings. Cases are recorded where patients who recovered from the primary attack died later from a septicæmic condition with lung lesions resembling tuberculosis (Manson-Bahr, 1941).

We have been able to trace records of only five chronic cases, two recorded by Stanton and Fletcher (1932), two by Souchard and Ragiot (1933) and one by Grant and Barwell (1943). We are unable to obtain access to a paper by Huard and Long (1937), the title of which, "Melioidosis and Surgery in the Far East: 14 cases," suggests that the chronic condition may not be so rare. Of the five chronic cases referred to all, except one, had an acute preliminary infection. This was a child of 18 months, reported by Souchard and Ragiot (1933), who showed an osteitis of the 5th metacarpal bone with an overlying abscess and an abscess of the left parietal bone. This patient recovered after six months' illness. Apart from the other case referred to by Souchard and Ragiot (1933), in which the genito-urinary system was involved with subsequent complete recovery, bone lesions were present in all chronic cases.

One of Stanton and Fletcher's (1932) chronic cases harboured the causative organism for two and a half months in a discharging sinus over the left external malleolus. He recovered completely five months after the onset of the illness.

The other case recorded by Stanton and Fletcher (1932) was observed over a period of two years. At the end of that time the patient was in apparent good health but sinuses in his feet leading to necrosed bone were still discharging although no organisms could be isolated from the pus.

It is not possible for either the incubation period or the duration of illness of the case reported by Grant and Barwell (1943) to be estimated with any degree of accuracy in view of the presence of a concurrent gonococcal infection. It is of interest, however, that in this case definite bone lesions occurred in the bodies of the 4th and 8th dorsal vertebrae with a perispiral abscess and also in one external malleolus and the frontal bone of the skull. The infection in this case occurred in a soldier who had left Malaya before the outbreak of hostilities in 1939.

The infection about to be described was acquired by a member of His Majesty's Forces in Malaya after the outbreak of hostilities in September, 1939. It is described because of its clinical interest and because it is possible that further cases of this infection may occur amongst the armed forces engaged in the areas in which melioidosis is known to exist.

CASE REPORT.

The patient, a Regular Army soldier, was aged 33 when his illness started. He is unmarried and there is no history of tuberculosis or other chronic illness in his family. He himself had a left-sided empyema in early childhood but does not know how this arose; it evidently healed without complications after drainage and has caused no trouble since. At 15 years of age he had acute appendicitis and appendicectomy.

He joined the Army in 1930, having previously worked as a motor driver in England. He served in India from 1931 to 1937, during which period he had attacks of dysentery, malaria and tonsillitis. In October, 1938, he arrived at Singapore and remained there until invalided for the present illness. In February, 1940, he had urticaria and swelling of finger and toe joints which disappeared after two months following tonsillectomy and an autogenous vaccine. There is no history of venereal disease. So far as he knows none of his companions sustained any illness comparable with his own.

The present illness started in June, 1940, with the onset of pain in the lumbosacral region radiating down both thighs, especially the right. This was insidious in onset and there was no history of trauma. He was admitted to hospital on July 28, 1940, on account of increased pain. Irregular pyrexia and heavy night-sweats were noted. No abnormal physical signs were found at that time apart from stiffness of the lumbar spine and enlarged, rubbery, inguinal glands on which biopsy revealed no abnormality. X-ray of lumbar spine and sacro-iliac joints showed no abnormality but, late in August, 1940, he developed flexor spasm of the right hip and slight wasting was noted. Blood count at this time was: R.B.C. 5,800,000, Hb. 66 per cent, W.B.C. 12,800 with 72 per cent polys., 24 per cent lymphos., 1 per cent large monos. and 3 per cent eosinos. Wassermann was negative, Widal positive only in very low titre, repeated blood cultures negative, stools negative for ova, cysts and occult blood and his urine contained occasional leucocytes only. Irregular pyrexia continued, decreased temporarily by two courses of M & B 693, and he was gradually losing weight. Blood sedimentation rate was 60 mm. in one hour in October, 1940, but fell to between 20 mm. and 30 mm. in November. He was diagnosed spondylitis ankylopoietica. In late January, 1941, he developed a lumbosacral abscess which was aspirated but the pus proved sterile. In February, 1941, he was transferred from Singapore to India by hospital ship, having remained in bed since admission to hospital.

Later in February, 1941, a right sacro-iliac abscess developed and on culture of aspirated pus *V. alkaligenes* is said to have been grown. Animal inoculation proved negative for tuberculosis but injected guinea-pigs died of a virulent septicæmia. Lower back pain and swinging pyrexia continued and a further course of M & B 693 had no marked effect but there was slight clinical improvement with rest and massage. In June, 1941, slight rarefaction and loss of definition in the lower part of the right sacro-iliac joint was seen on X-ray and in the chest bilateral apical pleural thickening but no other abnormality. Wassermann, Kahn and Widal reactions were again negative and the Weil-Felix reaction was positive at 1 in 25 against *B. proteus* OX19, OX2 and OXk.

In July, 1941, bilateral sacro-iliac abscesses developed which were aspirated and later drained. The aspirated pus proved sterile on culture, but *Staph. aureus* and *albus* were grown from specimens taken at the drainage operation and inoculated guinea-pigs died of *Staph. aureus* septicæmia with multiple small lung abscesses. In August, 1941, X-ray

showed gross widening with bone destruction in the lower part of the right sacro-iliac joint, affecting chiefly the alium of the sacrum and narrowing and blurring in the upper part of the joint with subarticular sclerosis here. Now diagnosed tuberculous sacro-iliac arthritis with probable secondary infection, the patient was put into a plaster double-hip spica with windows over the sacro-iliac drainage sinuses which subsequently healed. Still the irregular swinging pyrexia and gradual loss of weight continued and, in November, 1941, an abscess in the right groin ruptured under the plaster which was then removed and the patient kept flat in bed. Further destruction of the right sacro-iliac joint was visible radiologically but pus from the sinus in the groin was negative for *B. tuberculosis*. This sinus healed in April, 1942, and about this time destruction and sclerosis at the lumbosacral joint were seen on X-ray. A month later, X-ray of the chest showed extensive infiltration at the right base, bilateral apical pleural thickening and bilateral hilar enlargement and wedge-collapse of the 8th dorsal vertebra was also discovered, with a large paravertebral abscess and no obvious diminution of the disc spaces. Blood sedimentation rate was now 110 mm. in one hour and blood count showed R.B.C. 5,400,000, Hb. 60 per cent, W.B.C. 6,400, with 52 per cent polys., 45 per cent lymphos., 3 per cent large monos. Urine was normal and repeated sputum examinations were negative for *B. tuberculosis*.

In May, 1942, he was transferred to his present hospital in South Africa and, on admission, was complaining of vague backache and of pain radiating down the right leg of three weeks' duration. He was still losing weight, his general condition was poor and he was running an intermittent irregular swinging pyrexia up to 102° which has continued at intervals ever since (June, 1943). There was an angular kyphosis at the 8th dorsal segment of the spine with slight local tenderness and right psoas spasm with a flexion-adduction deformity and painful, limited movements at the right hip-joint. Knee and ankle jerks were equal but unusually brisk and there were no other abnormal nerve signs. In the chest, poor expansion on the right side with bronchial breathing over the right lower lobe and dullness in the right mid-zone were noted.

He had no cough or sputum and twenty consecutive examinations for *B. tuberculosis* since admission here have proved negative. He was, however, still considered until very recently to be tuberculous and the radiological appearance of the chest was consistent with this diagnosis. A plaster jacket had been applied early in June, 1942, but this had to be removed five weeks later owing to a sacral sore. About this time a right psoas abscess re-developed which was aspirated but ruptured in the groin at the end of July and healed two or three months later. Adductor spasm of the right hip continued and knee and ankle jerks remained exaggerated without other signs of nerve involvement. Blood count now showed R.B.C. 3,400,000, Hb. 55 per cent, W.B.C. 12,200 with 87 per cent polys., 12 per cent lymphos., 1 per cent large monos. Blood sedimentation rate (Wintrobe) has varied irregularly throughout the year he has been here between 24 and 93 mm. in one hour.

In August, 1942, he had a single hæmorrhage from the bowel, the origin of which was never discovered and which has not been repeated. In September, 1942, skin-traction was applied to the right thigh to overcome the flexion-adduction deformity at the hip which was tending to increase. X-ray at the beginning of October, 1942, revealed complete destruction of the head of the right femur with some destruction of the upper part of the acetabulum and dislocation of the right hip-joint. There was no obvious change in the appearance of the right sacro-iliac joint but there appeared to be active infection of the lumbosacral joint which showed considerable irregularity. In the dorsal spine, increased wedging of the 8th dorsal vertebra was noted with large bilateral paravertebral abscesses and in the chest slight opacity at both apices, increased striation at the right base less marked than previously, and slight mottling of the left lung.

The deformity at the right hip corrected very slowly under skin traction and in December, 1942, a long right plaster hip spica was applied under general anaesthesia with manipulation of the hip into slight flexion and abduction. The sacral sore had only just healed at this time and no abnormality could now be detected in the tendon jerks. His general condition started gradually to improve and all pain disappeared but, a month after application of the plaster, there were signs of a cold abscess deeply placed in the right buttock which gradually subsided without coming to the surface.

When first seen by one of us (J. H. M.), at the end of March, his general condition was fairly good though blood sedimentation rate at that time was 61 mm. in one hour and

intermittent bouts of pyrexia continued. Early in April a slight purulent discharge developed under the plaster on the left side which proved to be due to a superficial sore over the iliac crest. He was replastered in mid-April when an abscess was discovered pointing and almost rupturing through the skin about 4 inches below the right anterior superior iliac spine. The scars of the earlier bilateral sacro-iliac abscesses were both slightly moist but this appeared to be due simply to skin erosion as there was no discharge and no sinuses could be found. The right hip joint, which had deformed into marked internal rotation, was manipulated into slight external rotation under general anaesthesia between the plasters. X-ray at this time showed no marked changes compared with previous examinations.

Two days later the abscess in the right thigh was aspirated through an oblique puncture. The pus was unusually thin for tuberculous material and was diffusely blood-stained. A specimen was sent for laboratory examination and from this *P. whitmori* was isolated in pure culture. In view of this finding the following further investigations were carried out with negative results: Sputum examination for acid-fast bacilli: Complete urinalysis and culture: Culture of faeces for *P. whitmori*: blood culture: Wassermann, Kahn and gonococcal complement fixation tests: comprehensive tests for agglutinins against organisms of the Enteric, Brucella and Proteus groups. Agglutination at a dilution of 1 in 500 was obtained against *P. whitmori*.

Having accepted the diagnosis of chronic melioidosis it was decided to prepare an autogeneous vaccine for treatment in view of the beneficial results reported from its use by Stanton and Fletcher (1932). Sulphadiazine, which apparently had some temporary beneficial effect in Grant and Barwell's (1943) case, was not available. Our patient has been receiving the vaccine since May 10, a primary dose of 10 million organisms being administered. By the time of writing (June, 1943) the dose has been increased to 100 million. The vaccine has produced no noticeable local reactions but the patient showed a continuous, swinging pyrexia, subnormal in the mornings and up to 100 at night, which was probably due to the refilling of the abscess in his right thigh. On May 13 the sacral sore started to discharge small quantities of pus which, when cultured, produced a mixed growth of *P. whitmori* and *Staph. albus*. On May 15, the thigh abscess, having refilled, was re-aspirated and again *P. whitmori* was grown in pure culture. A blood count on May 19 showed: R.B.C. 5,330,000, Hb. 93 per cent, W.B.C. 14,000, with polys. 55 per cent, lymphos 38.5 per cent, large monos. 3.5 per cent, eosinophils 1.5 per cent and basophils 1.5 per cent. Blood sedimentation rate on this date was 93 mm. in one hour.

On May 21 a discharge appeared under the plaster from the right groin and, on May 24, the plaster was removed. The sacral sore appeared to be purely superficial and the old sacro-iliac scars were dry. The new sinus in the medial part of the right groin did not communicate with the large thigh abscess but led to a track passing backwards and upwards deep to Poupart's ligament and probably to the psoas muscle down which it is suspected to have tracked from the right sacro-iliac joint. The thigh abscess was incised in three places to obtain satisfactory drainage and about 200 c.c. of blood-stained "anchovy-sauce" pus was evacuated. The abscess extended upwards to the region of the anterior superior and anterior inferior iliac spines and, though not obviously communicating with the hip-joint, it was certainly very close to the ilium just antero-lateral to the joint. The abscess cavity was thoroughly swabbed with eusol. Following the X-rays, the right hip was manipulated into neutral position and a long plaster hip spica was re-applied with windows over the infected areas. Despite the radiological appearances, suggesting bony ankylosis, the hip joint clinically was not yet stable.

X-rays of this date also revealed distinct narrowing of the intervertebral disc between the 11th and 12th dorsal vertebrae, without obvious bony changes, and there was a slight kyphosis at this level clinically. Review of previous X-rays shows that a similar change was just visible six months, but not a year, previously and this is apparently a new lesion in an early stage of development. It is of interest in that the bony lesions in all other recorded cases, and also the other lesions in our own case, have started as osteitis, whereas this appears to be rather an arthritis.

Within a week the drainage sinuses were practically dry and at the time of writing the temperature is falling and the patient's general condition continues to improve.

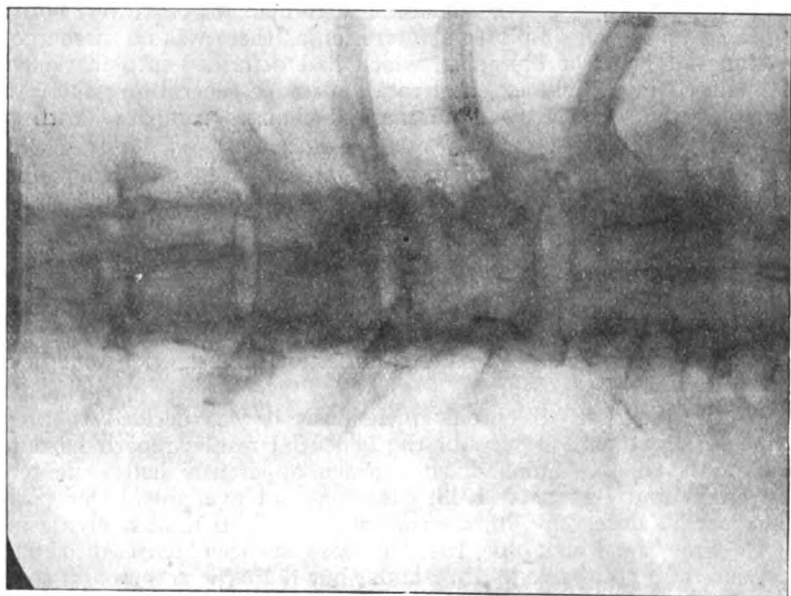


FIG. 2A.—Dorsal spine, A-P view, showing collapsed 8th dorsal vertebra with large left and small right para-vertebral abscesses.

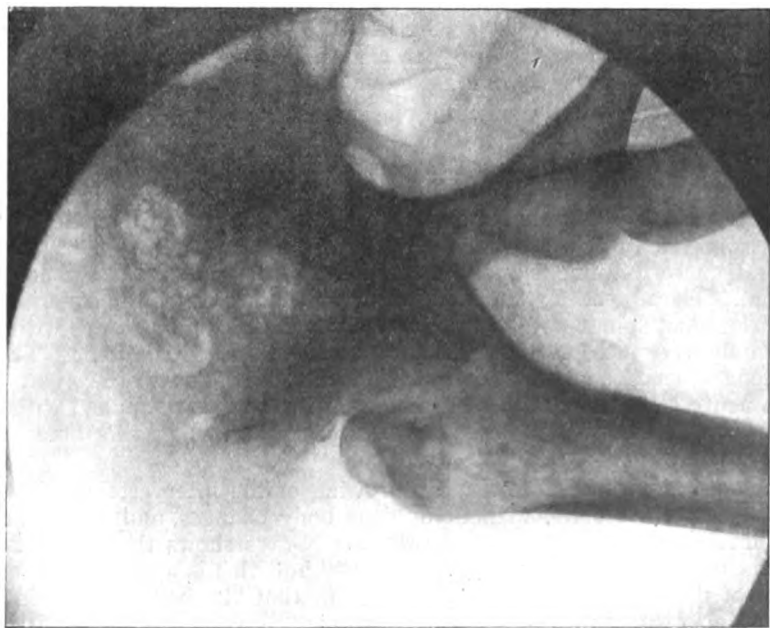


FIG. 1.—Right hip joint, showing dislocation and destruction of head and upper part of neck of femur.



FIG. 3.—Sacro-iliac joints, showing gross bone destruction in the lower part of the right sacro-iliac joint ; narrowing and subarticular sclerosis of the left sacro-iliac joint ; generalized decalcification.

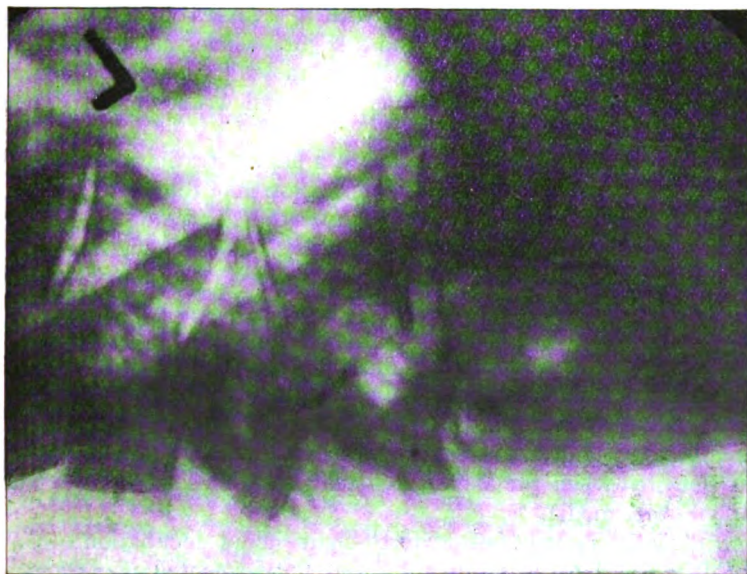


FIG. 2a.—Dorsal spine, lateral view, showing wedge-collapse of body of 8th dorsal vertebra with minimal disc narrowing.

BACTERIOLOGY.

No organisms were observed on direct examination of a sample of pus submitted to the laboratory on April 20, 1943. A culture of the pus on blood-agar produced a fine growth, after twenty-four hours incubation, of a small Gram-negative bacillus showing polar staining. After seventy-two hours incubation, the growth on blood-agar was abundant, smooth, grey and glistening and resembled the growth of the smooth form of *P. whitmori*.

Morphology and Staining.—The organism was a small bacillus about 2μ in length by 0.5μ wide, non-sporing, actively motile and showed no evidence of capsule formation. When stained with Loeffler's methylene blue it showed the presence of an interstitial substance which formed a background to the masses of bacilli and resembled the appearance of the smooth form of *P. whitmori* described by Topley and Wilson (1941). The bacillus was readily, but rather faintly, stained by the simpler aniline dyes. It was Gram-negative and stained rather poorly with Neisser's, Albert's and Leishman's stains. Good differentiation was obtained by staining with dilute carbol-fuchsin and counter-staining with dilute methylene blue. This method showed red granules on the blue background of the bacilli. When smears were stained with carbol-fuchsin and decolorized with 10 per cent acetic acid or $2\frac{1}{2}$ per cent sulphuric acid for five minutes, small acid-fast granules were observed on the body of the organisms and also lying separately. The acid-fastness of these granules was more pronounced in old cultures, especially in involution forms, and in smears from a twenty-one-day broth culture many granules were resistant to decolorization by 25 per cent acid after five minutes. They were readily decolorized by a few seconds' treatment with ethyl alcohol. The bacilli were well demonstrated in the tissues by means of carbol thionin. They appeared longer and narrower than on culture and sometimes showed short chain formation when observed in sections of organs of experimentally inoculated animals.

Cultural Characters.—The newly isolated organism grew on ordinary nutrient media and produced a distinct growth on agar after twenty-four hours incubation at 37° C. After forty-eight hours incubation the colonies were about 2 mm. in diameter and later showed a depressed centre surrounded by a raised ring. Three types of colony were isolated from the exudates of experimentally infected animals: One, which was perfectly smooth in texture and consistency and which grew rather slowly; a second type, identical in form with the colonies originally isolated, and a third with a wrinkled rather rugose surface.

In nutrient broth the growth was uniform and a slight pellicle was usually formed after twenty-four hours. The smooth variant showed the most abundant pellicle formation. After two to three weeks growth the pellicle was thick and wrinkled and extended deep into the broth with numerous heavy wrinkled folds.

Nutrient gelatine was rapidly liquefied and showed a heavy stratiform growth. Complete liquefaction was achieved in four to six days and a dense growth of the organism was observed at the foot of the culture tube. No pellicle was seen on the surface of the gelatine.

On Loeffler's serum the growth was smooth and shiny. No liquefaction was observed after fourteen days incubation. Growth in milk was rapid with clot formation after forty-eight hours incubation and commencing digestion of clot after seventy-two hours.

Growth on MacConkey's agar was slow. After forty-eight hours distinct colonies were observed. After seventy-two hours incubation most of the colonies were about 2 mm. in diameter, smooth in texture, pale brown in colour with a more deeply coloured depressed central area. A few small, pinkish, smooth colonies of uniform texture were also seen. After seven days incubation the growth assumed a marked metallic sheen. A well-defined aromatic odour was detected when the MacConkey plate was opened. This odour was not observed in cultures on other media.

Fermentation of glucose occurred after forty-eight hours incubation. No gas was formed. Lactose, dulcitol, saccharose and mannite were not fermented even after incubation for twenty-one days. Andrade's indicator was completely decolorized after forty-eight hours incubation. Indol was not formed in peptone water.

No growth on ordinary media was observed under anaerobic conditions.

Animal Experiments.—0.5 c.c. of a twenty-four hour broth culture, injected intraperitoneally, killed a guinea-pig in thirty hours. At autopsy the peritoneal cavity was filled with a copious glairy exudate. The spleen was enlarged and showed numerous minute white nodules. The liver was also enlarged. The lungs appeared congested. Cultures from the peritoneal exudate and heart blood produced a copious fine growth of *P. whitmori*. Histological examination of the organs showed: (1) Spleen very congested and contained numerous small necrotic areas. The sinuses were filled with red cells and large round inflammatory cells. The follicles were congested and hyperplastic. Numerous areas of early necrosis with well-marked karyorrhexis were observed. The organisms were present in large numbers throughout the tissue. (2) Liver was markedly congested and entertained numerous small hæmorrhagic areas. The liver cells showed well-marked vacuolation and small groups of cells showing karyorrhexis were observed. A zone of inflammatory round cells was seen around the engorged portal vessels. Numerous bacilli were seen, especially amongst the cells showing karyorrhexis. (3) Lung: The alveolar capillaries were markedly congested and many of the alveoli were filled with red cells and inflammatory cells. Numerous small abscesses were observed in the neighbourhood of intensely congested blood-vessels. The smaller bronchi were filled with inflammatory cells, chiefly large round cells. A few bacilli were observed in the alveolar walls.

Two mice were inoculated intraperitoneally, one with 0.2 c.c. of a twenty-four-hour broth culture prepared from a smooth colony, the other with 0.2 c.c. of a twenty-four-hour broth culture prepared from a rough colony. Both mice died within forty hours and showed similar post-mortem appearances to the guinea-pig described above. A similar experiment was carried out, using two male guinea-pigs, one of which was injected intraperitoneally with 0.2 c.c. of a twenty-four-hour broth culture prepared from a smooth colony and the other with 0.2 c.c. of a twenty-four hour broth culture prepared from a rough colony. The first guinea-pig died fifty-six hours after inoculation whereas the second died ninety-two hours after inoculation and showed a pronounced scrotal swelling.

A typical Straus reaction was produced by injecting a male guinea-pig intraperitoneally with 0.02 c.c. of a twenty-four-hour broth culture. The animal died seven days after inoculation. At autopsy a copious glairy peritoneal exudate was observed. The liver was enlarged and the spleen contained numerous coalescing small abscesses. The lungs were congested and adherent to the chest wall. The tunica vaginalis was filled with thick caseous material. *P. whitmori* was isolated from the peritoneal exudate.

Serological Reactions.—On April 27, 1943, a sample of the patient's serum was examined for the presence of agglutinins using the Dreyer technique. A twenty-four-hour broth culture containing 0.5 per cent formalin was used. Two normal sera were used as controls. Definite large-flake agglutination at a dilution of 1:500 was obtained with the patient's serum. No agglutination at a dilution of 1:25 occurred with the control sera.

An attempt was made to obtain an O suspension by alcoholizing agar cultures. No trace of agglutination was observed when the alcoholized suspension was incubated with the patient's serum. Further tests carried out with the patient's serum and smooth suspension heated to 60° C. for one hour failed to elicit satisfactory agglutination when compared with the results obtained using suspensions treated with 0.5 per cent formalin. The sera from sixteen cases of proven tuberculosis were examined for the presence of agglutinins against our strain of *P. whitmori*. Several sera showed definite agglutination at a dilution of 1:50 only.

Mallein Test.—The patient and nine controls were each inoculated subcutaneously with 0.2 c.c. of a 1:10 dilution of Mallein prepared at the S.A. Government Veterinary Laboratories, Onderstepoort. Apart from a red local swelling developing about four hours after the inoculation and lasting for about thirty-six hours, the patient showed no reaction to the Mallein. Similar reactions were observed in a number of the controls and it was clear that our case did not react specifically to the Mallein used in the test.

DISCUSSION.

The case described is remarkable for its insidious onset, its great chronicity, its remarkable resemblance to pulmonary and articular tuberculosis and the multiplicity of lesions. Originally diagnosed as spondylitis ankylopoietica and later as pulmonary and articular tuberculosis, it was not until two and three-quarter years after the onset of the illness that the organism was isolated which could be considered the specific ætiological factor.

This organism was found to resemble *P. whitmori* in almost every respect. It was observed, however, that whereas all descriptions of *P. whitmori* available to us state that it possesses no acid-fast properties, the organism isolated from our case shows beads or granules which are resistant to decolorization by 2.5 per cent sulphuric acid or 10 per cent acetic acid acting for five minutes. Despite this characteristic, and although it has not been possible for us to compare the organism isolated from our case with recognized strains of *P. whitmori*, the descriptions available—Stanton and Fletcher (1932), Topley and Wilson (1941)—would indicate that the general characters of our strain entitle it to be classified as *P. whitmori*.

It is of interest to speculate on the possible relationship of the acid-fast properties of our strain to the chronicity of the lesions produced in our patient and their marked clinical resemblance to tuberculous lesions. It should be pointed out, however, that our strain produces the acute granulomatous lesions in rodents which have been described as characteristic for *P. whitmori*.

Melioidosis is recognized as a disease of rodents and men and it is generally assumed that infection of men is acquired through infected rodents, possibly by infestation of food and water supplies. In our case there is no record of any such infestation although it is possible that the water supply of the Battery to which the patient was attached may have been infected. Another possibility is that our patient may have been infected by a tattoo artist in Singapore by whom he was liberally tattooed before the development of his first symptoms.

Apart from Grant and Barwell's case (1943), we have been unable to find a record of any case of chronic melioidosis in which the onset was as insidious as that recorded above. These authors suggest that the first clinical signs in their case might have been arthritis of one hip and one ankle-joint. Here the issue was muddled by concurrent gonococcal infection whereas, in the case just described, arthritis was undoubtedly the first clinical manifestation and in this respect the case differs from any other previously described.

The early low backache with sciatic radiation did not incapacitate our patient during the first month of his illness and although, when admitted to hospital, he was suspected to have a low-grade septicaemia, no specific ætiology was identified. In the absence of radiological abnormalities, the diagnosis of spondylitis ankylopoietica was made as the only likely cause of his symptoms: later this was amended, on account of the development of abscesses and radiological changes, to tuberculous arthritis and not until two and three-quarter years after the onset of symptoms was the true cause discovered.

In reconsidering the case in retrospect, several minor features which might have aroused doubts as to the diagnosis of tuberculosis can be detected, such as the long-continued pyrexia despite adequate rest before the development of radiological lesions and, later, the wedge-collapse of the 8th dorsal vertebra with minimal disc-narrowing and no affection of adjacent segments and the failure to obtain *B. tuberculosis* from two dozen or more sputum examinations despite the radiological evidence suggesting widespread active pulmonary infection.

The majority of cases of this disease previously recorded have occurred in natives. Of the chronic cases recorded, Grant and Barwell's, (1943), is the only previous one reported in a European and, like our case, has pursued an unusually chronic course. It is possible that Europeans possess greater resistance than Asiatics to infection with *P. whitmori* and that in them the condition may resemble the chronic granulomata. Should this be so, it is not impossible that cases of chronic melioidosis may occur in European troops campaigning

in the areas in which the disease is endemic and may be mistaken for pulmonary or articular tuberculosis. The development of chronic granulomatous lesions in persons who have lived in the Far East should invite the possibility that the infection may be chronic melioidosis and all possible steps should be taken to exclude this diagnosis before a definite and final diagnosis of tubercular infection is made.

ACKNOWLEDGMENTS.

We have to thank Brigadier A. J. Orenstein, *C.B., C.M.G., C.B.E.*, for permission to forward this paper; Colonel L. I. Braun, *C.B.E.*, for his interest in this work; and Lieutenant-Colonel M. Weinbren and Major C. P. Theron for their help in the preparation of reproductions of the X-ray negatives.

BIBLIOGRAPHY.

- ALAIN, M., and DELBOVE, P. (1939). *Bull. Soc. Path. Exot.*, **32**.
 GRANT, A., and BARWELL, C. (1943). *Lancet*, **1**, 199.
 HUARD, P., and LONG, M. (1937). *Rev. de Chir. Paris*, **75**, 773.
 MANSON-BAHR, P. (1941). "Manson's Tropical Diseases," London, p. 307.
 SCOTT, H. H. (1939). "A History of Tropical Medicine," London, Vol. 2.
 SOUCHARD, L. (1932). *Arch. Inst. Pasteur d'Indochine*, **16**, 193.
 SOUCHARD, L., and RAGIOT (1933). *Bull. Soc. Path. Exot.*, **26**, 567.
 STANTON, A. T., and FLETCHER, M. (1925). *J. Hyg.*, **23**, 268 and 347.
Idem (1932). "Studies Inst. Med. Res." F.M.S. No. 21.
 TOPLEY, W. W., and WILSON, G. S. (1941). "The Principles of Bacteriology and Immunity," London, pp. 3602, 1114.
 WHITMORE, A., and KRISHNASWAMI, C. S. (1912). *Ind. Med. Gaz.*, **47**, 262.

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NOTES ON AN IMPROVISED NASAL OXYGEN APPARATUS.

BY LIEUTENANT-COLONEL W. A. ROBINSON, M.D.,

Royal Army Medical Corps.

THE following notes have been prepared in the hope that they will be helpful in solving the difficulty of providing a sufficient number of sets of oxygen administration apparatus to meet the needs that would arise in the event of chemical warfare in any theatre at home or abroad.

Most medical units have a limited number of oxygen administration sets such as the B.L.B., Haldane, Cambridge and Hi-Co apparatus. Owing to difficulties in transport and production in war it is not always possible to provide sufficient of these and, therefore, it may be necessary to improvise.

The apparatus to be described has undergone laboratory and clinical tests with satisfactory results. Details are given in this article.

THE MASK AND BREATHING BAG.

Major J. G. Scadding, R.A.M.C., drew attention to an improvised mask and breathing bag, which he had seen in use elsewhere, and very kindly produced a model. From this, plans were drawn (*see* figs. 1, 2 and 3). Considerable numbers of these masks and breathing bags have now been made in the M.E.

Instructions for making the Mask.

Required :

Used and discarded X-ray films.

Adhesive solution made by dissolving small pieces of cleaned X-ray film in acetone until it is of a "gummy" consistency.

A piece of glass tubing, $1\frac{1}{2}$ inches long, external diameter 8 mm., internal diameter 6 mm.

Tubing I.R. size 10. Adhesive tape. Cotton tape.

Method :

(a) Soak the used X-ray film in hot water and wash until clean and transparent. Leave to dry.

(b) Make, from 3-ply wood or stout cardboard, permanent shapes having the exact size and outline of A and B in fig. 1. This can be done either by tracing from fig. 1 or by pasting it on to the wood or cardboard and thereafter carefully cutting round the outline. These shapes serve as guides for cutting the film.

(c) Prepare the required number of Parts A and B by placing these shapes on the cleaned X-ray film and cutting round the outline with a safety-razor blade or some other suitable cutter.

(d) Fold over the teeth in Part A to a right-angle at the dotted line shown in fig. 1.

(e) Bend Part A so that the holes overlap : insert glass tubing, C, through the holes, with the lipped edge inside the mask.

(f) Place Part B on Part A, bent to a corresponding ovoid shape, and seal the teeth of A on to B with acetone solution. Seal the overlap in Part A. Leave to dry.

(g) Take a piece of rubber tubing long enough to encase the sharp free edge of A. Slit it longitudinally, slip it over the edge, and fix it in position by a few small strips of adhesive tape.

(h) Attach pieces of cotton tape for tying round the patient's head through the slits in the projecting lugs in B.

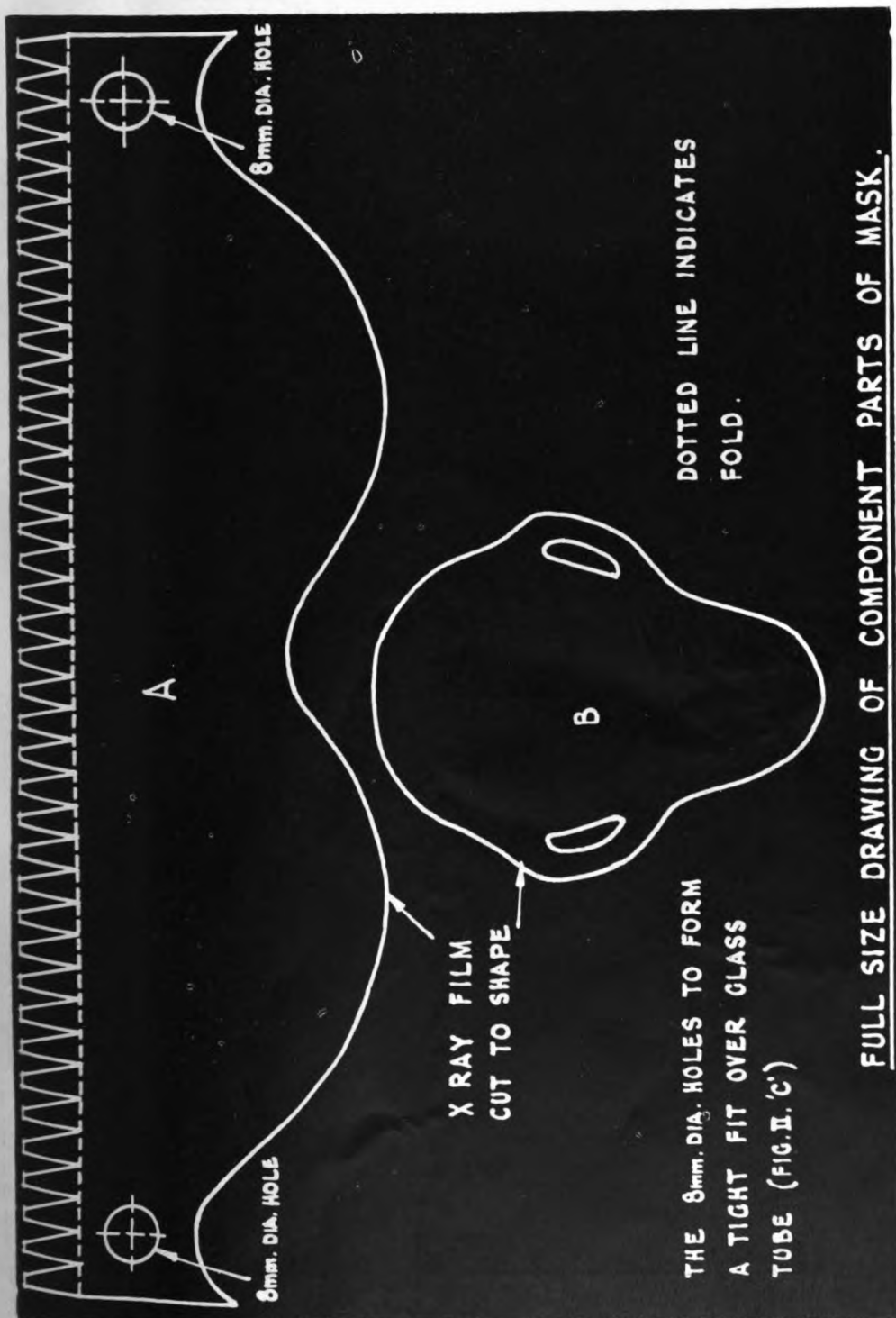


FIG. 1.

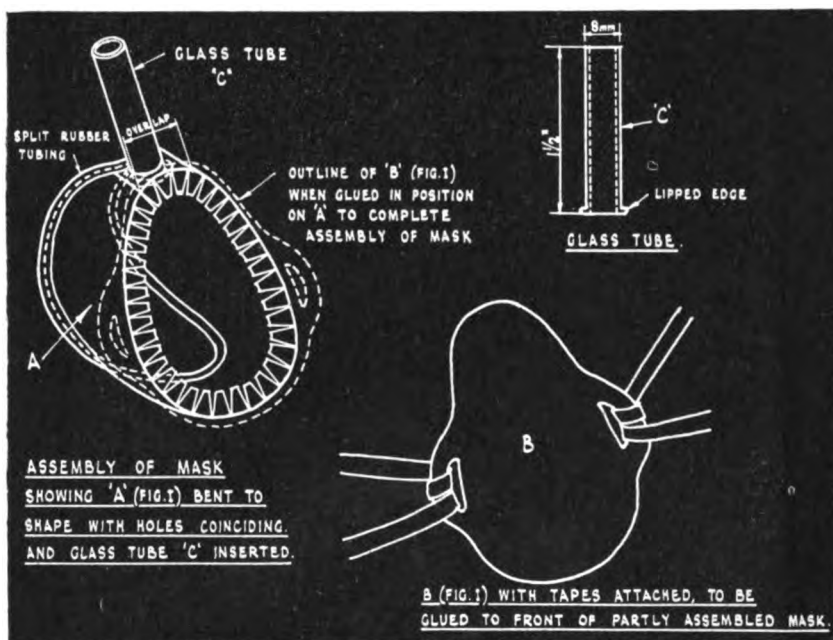


FIG. 2.

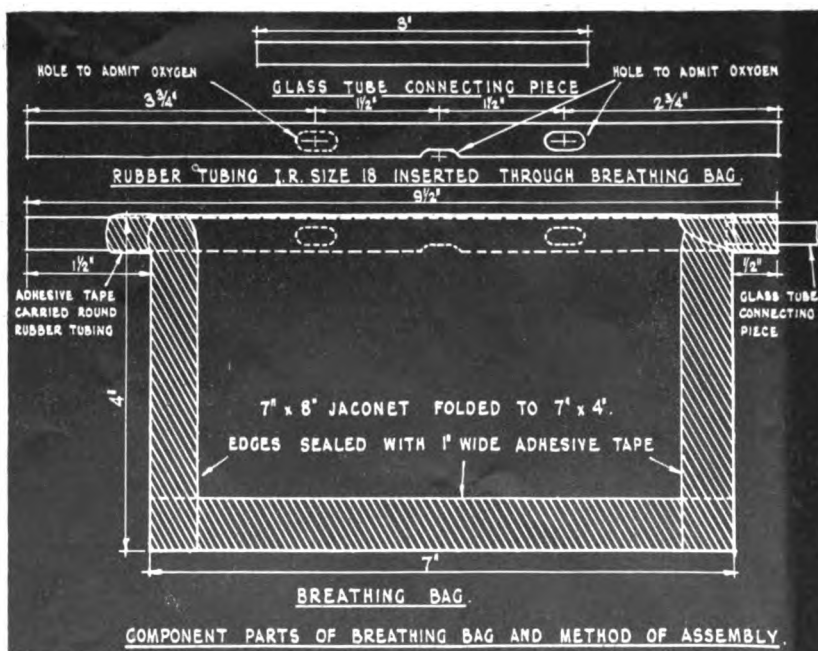


FIG. 3

*Instructions for making the Breathing Bag. (Fig. 3.)**Required :*

Rubber tubing, size 18, length $9\frac{1}{2}$ inches, with three holes in the side at different points near one end.

Jaconet, 7 inches by 8 inches.

Adhesive tape, width 1 inch.

Glass tubing, length 5 inches, not lipped.

Method :

- (a) Fold the jaconet exactly in two, so that, when folded, it measures 7 inches by 4 inches.
- (b) Insert the perforated rubber tubing between the folds against the blind edge, as illustrated in fig. 3, taking care that the perforations are inside the bag-to-be, but not occluded.
- (c) Bind the free edges of the folded jaconet together with the adhesive tape, so as to convert it into a rectangular closed bag. Reinforce with an extra piece of adhesive tape round the points of entrance and exit of the rubber tubing.

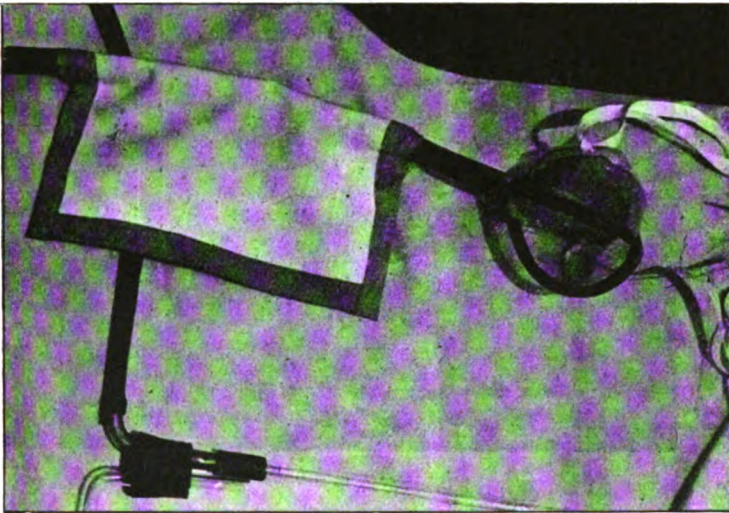


FIG. 4.

(d) Slip the longer free end of rubber tubing over the glass connecting piece emerging from the mask.

(e) Slip the 3-inch piece of glass tubing, noted above, into the short free end of the rubber tubing. This is the connecting piece for attachment to the flowmeter.

Fig. 4 illustrates the nasal mask and breathing bag joined together.

THE FLOWMETER.

A simple form of flowmeter for use with the mask, which could be made from materials of which ample supplies were available locally, was devised in collaboration with various medical officers.

The principle is as follows : The oxygen, between the cylinder and the mask, is made to pass through a small aperture of standard size. The rate of flow through this aperture depends on the pressure behind. This is measured by the downward displacement, against atmospheric pressure, of a column of water in a glass tube—in other words, by a simple manometer.

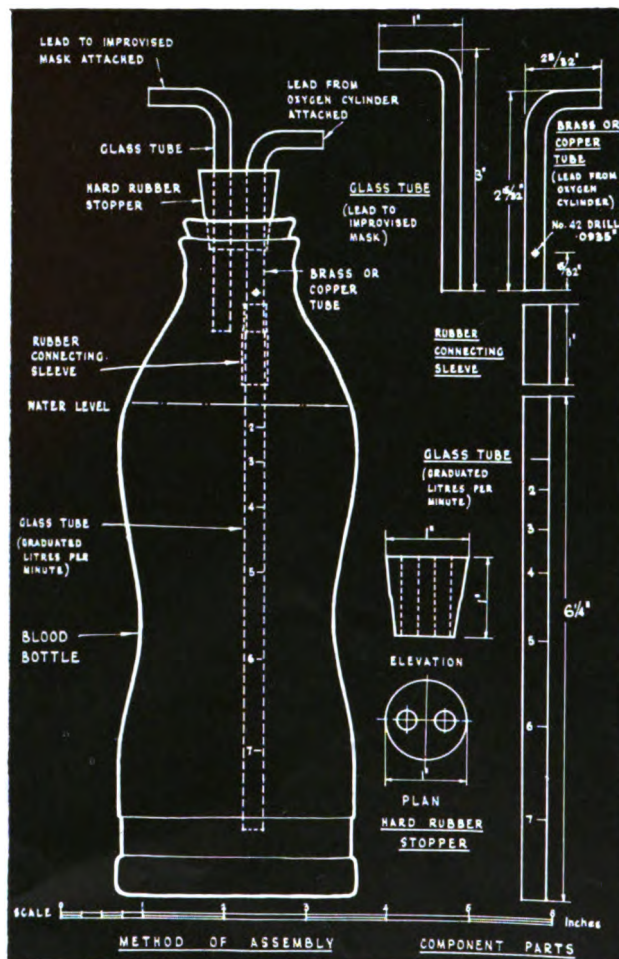


FIG. 5.

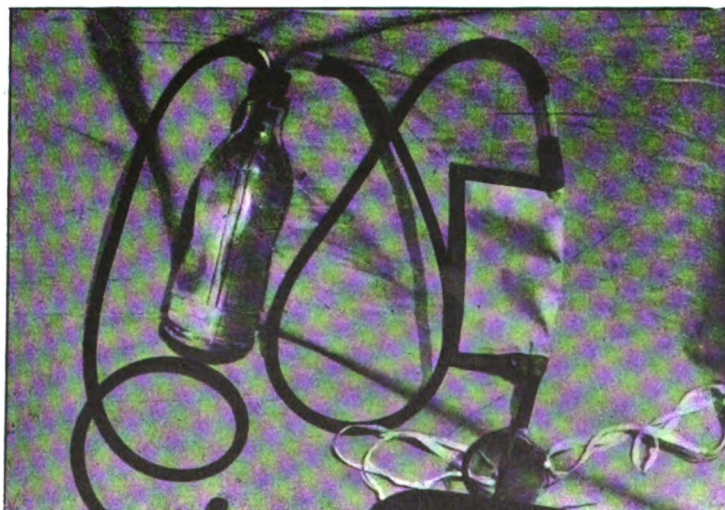


FIG. 6.

Instructions for making the Flowmeter.

(For details, see fig. 5.)

Required :

- A standard "Bristol" blood-bottle with a tight-fitting rubber bung with two perforations to take glass tubing.
- A piece of copper or brass tubing of the shape and dimensions given in fig. 5. In this is drilled a hole which must be standard, as the graduations on the manometer depend on this. The tubes can be made by Ordnance workshops.
- A straight piece of glass tubing, of approximately the same dimensions as the metal tubing, and a piece of rubber tubing to connect the two.

Method :

- (a) Assembly of the flowmeter needs no description. It is illustrated in fig. 5.
 - (b) Graduation is effected by connecting up the flowmeter in series with a standard flowmeter such as the B.L.B. To enable preliminary readings to be taken, make a series of grease-pencil or waterproof ink marks on the glass tubing.
 - (c) Pour water into the bottle until the manometer reads zero and adjust the cork firmly. It is essential that the level of the water should be exact.
 - (d) Then make the various connections, but before attaching to the cylinder gently turn on the oxygen, otherwise the first sudden rush before it is regulated might blow water out of the flowmeter.
 - (e) Regulate the flow of oxygen until it records 2 litres in the B.L.B. manometer. It will be seen that the column of water in the glass tube is forced down to a constant level. Note this level in terms of the grease-pencil marks.
 - (f) Increase the flow until the B.L.B. manometer records 3 litres and again make a reading.
 - (g) Repeat up to 7 litres.
 - (h) Disconnect and make permanent marks on the glass tube with a file to indicate the different readings.
- Once one manometer has been graduated in this way, others can be copied from it, provided the hole in the metal tube is constant.

Instructions for Use of Flowmeter.

- (a) Pour water into the bottle until, with the cork firmly pressed home, the level is exactly at the zero mark.
 - (b) Connect the flowmeter to the breathing bag by a suitable length of rubber tubing.
 - (c) Turn on the oxygen at the cylinder and, when a gentle, constant stream is issuing, attach to the flowmeter. Adjust the flow until the manometer reads $6\frac{1}{2}$ litres a minute.
- Readjustments of the cylinder tap will need to be made from time to time to maintain this rate of flow.

Complete Apparatus in Use.

The assembly of the different parts, and the method of applying the mask, are shown in figs. 6, 7 and 8. These figures are self-explanatory and no further description is necessary.

TESTS.

Laboratory.—Under the direction of Professor G. V. Anrep, M.A., M.D., D.Sc., F.R.S., Professor of Physiology of the Faculty of Medicine, Egypt, a test was made. The following is a copy of his report.

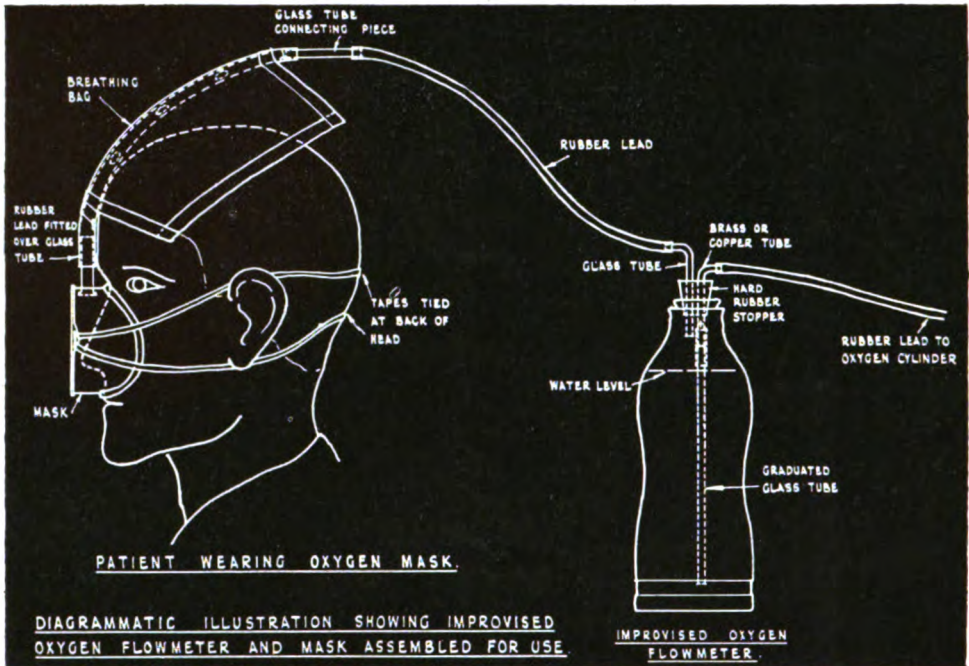


FIG. 7.



FIG. 8.

Physiological Laboratory.
30 Apr. 42.

" We tried the mask on two subjects with these results :

	Flowmeter	Alveolar CO ₂ %	Alveolar O ₂ %
1.	6 L	5.45	45.3
	6½—6¾ L	5.50	49.9
2.	6 L	5.32	44.3
	6½—6¾ L	5.40	50.5

These figures are not reduced to N.T.P. The CO₂ shows that there was no overventilation during the experiment.

(Sgd.) G. V. ANREP."

Clinical.—By kind permission of Colonel H. D. F. Brand, Officer Commanding, — (Scottish) General Hospital, the apparatus was tested clinically. The following is the report :

" During the past two months the improvised nasal mask and flowmeter has been in use in the administration of oxygen to cases of pneumonia in the medical wards of this hospital. It has proved an excellent substitute for the B.L.B. apparatus. It is light and comfortable to wear, allows of freedom to the mouth and remains in position during vomiting and feeding. The flow of oxygen is adequate if the flowmeter is properly adjusted but care is required in doing this at the commencement.

Recommendations :

- (i) Tapes should be fixed across the head from the upper horizontal tapes to prevent the breathing bag from falling off the head.
- (ii) A longer rubber attachment from the nose-piece to the flowmeter is necessary to allow of free movement of the head.

— *General Hospital.*
30 June, 1942.

(Sgd.) J. H. DUNN, Lt.-Col.,
O.C. Medical Division."

CONCLUSIONS.

This improvised oxygen apparatus has proved satisfactory. Although in appearance it looks very fragile it has the advantage that, if the mask is damaged, it can easily be replaced.

It permits the patient to expectorate, vomit and drink without interrupting the flow of oxygen.

In hot weather, the patient has no feeling of discomfort owing to its lightness.

In the event of chemical warfare on a large scale, this improvised mask is likely to form a good substitute for the standard oxygen apparatus, sufficient numbers of which are not available.

My thanks are due to all those officers mentioned in these notes. In addition, I am most grateful to Colonel J. S. K. Boyd for his continued encouragement and for reading and correcting the proofs, to Major D. W. Ashcroft, R.A.M.C., for photographs and to Corporal J. C. Kenyon, R.E., for figs. 1, 2, 3, 5, and 7, on which he took endless trouble.

A SIMPLE ARTIFICIAL RESPIRATOR.

BY CAPTAIN P. W. NATHAN, M.B., M.R.C.P.,

Royal Army Medical Corps.

CASES which need treatment in a Drinker or a Both-Nuffield respirator sometimes die before they arrive at the hospital where this type of permanent respirator is installed. These are probably cases of anterior poliomyelitis, acute ascending polyneuritis or paraplegia due to trauma. For such cases I have worked out a simple form of respirator which can be put together by a field ambulance from materials at hand. It would also be of use for resuscitation of the drowned and those poisoned by carbon monoxide or for any cases needing artificial respiration. These cases should be put on the respirator before natural respiration fails; that is, as soon as there is any respiratory embarrassment or as soon as it is seen that the ascending paralysis has reached the lower intercostals. This is a temporary apparatus only and is intended for use before the patient can be brought to a negative-pressure respirator; it can be used in an ambulance or any vehicle.

The principle of the respirator is to rock the patient up and down as though he were lying on a seesaw. This manner of artificial respiration has been used for hundreds of years by the Chinese but it was first thought of in Europe by Eve (1932). The respiration is performed by the diaphragm acting as a piston in the cylinder of the thorax; when the head is tipped down, the diaphragm comes up towards the head and pushes air out of the thorax; when the feet are tipped down, the diaphragm descends and air is sucked into the thorax.

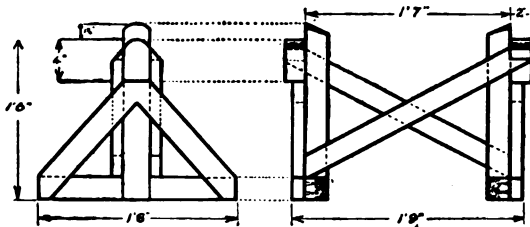
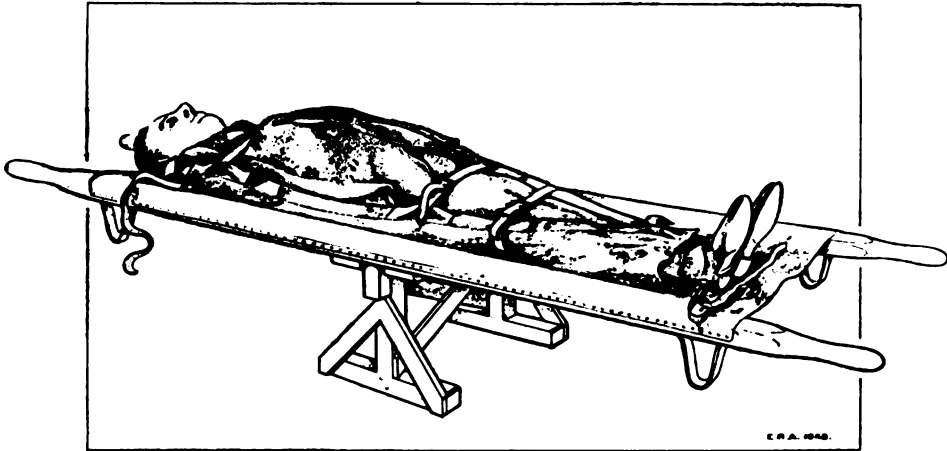
The apparatus is made from an ordinary Army stretcher, Mark II, the universal stretcher sheet, wood and screws. The stretcher is used as the plank of the seesaw and it is rocked on a pivot made of wooden struts screwed together. The universal stretcher sheet is used to wrap the patient in before he is placed on the stretcher; this is necessary, as there is bound to be some slip of the patient on the stretcher as he is rocked up and down. Were the patient to slip, taking the friction on his skin, he would soon develop bed-sores, particularly as he is likely to be paraplegic. It will be noted, then, that this stretcher sheet, which was originally designed as a cover, will be used as a sheet on which the patient lies. It is prepared by removing the metal clamps, which are used to attach it to the stretcher, with the straps fixed on to them. This is done by undoing the press-button at each end and drawing out the longitudinal metal rod; the clamps then slip off; the rods are put back. Then the patient is placed on the sheet. He is strapped into the sheet as firmly as possible, the straps passing over his body, bringing the two sides of the sheet towards each other by being attached to the metal rods on one side and passing through the canvas loops on the other. He is placed on the stretcher and fixed to it by means of the two longitudinal straps, fixed on to the stretcher sheet, known as the "loop-straps"; these straps are passed through the buckles of the stretcher, the buckles which are normally used for the straps which keep the stretcher rolled up. It will be found that a new hole will have to be made in these straps nearer their origin. In this way it will be found that, as the patient is rocked, there may be one centimetre or so of slip but the friction occurs between the universal stretcher sheet and the ordinary stretcher.

Any system of pivoting could be used. The illustration shows a simple fulcrum made of blocks of wood screwed together.

Two small blocks of wood are screwed on to the undersurface of the centre of each pole of the stretcher so that they form a rectangular notch into which the fulcrum fits; this prevents the stretcher sliding up and down. The stand must be well braced as it has to take the weight of the stretcher and the patient. The actual fulcrum on which the stretcher

rocks consists of a block of wood with the top rounded off antero-posteriorly ; this is firmly screwed into the lateral side of the stand so that it is one and a quarter inches below the top of the upright piece ; thus the upright piece fits inside the poles of the stretcher, preventing the stretcher slipping sideways. The Army stretcher being 7 feet 9 inches long, the height of the fulcrum should be 1 foot 7½ inches in order to allow the stretcher to make an angle of 25° with the ground. A height of 18 inches gives an angle of 24°, which will do as well.

The apparatus should be rocked at a speed of about ten up and down rockings a minute ; a conscious patient can tell roughly if he is being under- or over-ventilated. The motion is not one of an even, smooth rocking up and down. Each movement should be sharp, with a pause at the end of the down movement ; the longest pause in the feet-down position, for that is when inspiration has occurred. It should be remembered that the tendency is to be too energetic in working the apparatus and the patient is more likely to suffer from over-ventilation than from suffocation.



Artificial respirator.

A further advantage of the rocking method of artificial respiration, besides its simplicity, is that it aids cardiac return by alternately draining the head and the trunk and the lower limbs into the thorax. It is surprising how relatively little disturbing this rocking is to the patient ; some of the students on whom it was tried found it conducive to sleep. The jar experienced when the legs of the stretcher hit the ground can be softened by spreading a blanket on the ground.

Killick, Cowell and Crowden (1939) state : " The first criterion of an efficient method of artificial respiration is that it should produce a volume of ventilation per breath of at least 400 to 500 c.c." That is the normal tidal air.

This apparatus was tested on five male medical students. It is regrettable that no opportunity presented itself of testing the apparatus on a subject with respiratory paralysis. The excuse for presenting an apparatus which has not been adequately tested out in the conditions for which it is designed is that no previous worker on this subject has used patients with respi-

A Simple Artificial Respirator

TABLE I. (NATHAN).

<i>Subject</i>	<i>Type of respiration</i>	<i>Resp. rate</i>	<i>Ls. air expired per minute</i>	<i>c.c. air expired per breath (tidal air)</i>
1	Normal	14	15.7	1,000
1	Rocking at 25°	11	10.5	900
1	Rocking at 25°	12	11.6	900
2	Normal	24	5	210
2	Rocking at 25°	15	13	900
2	Normal	20	9	450
2	Schaefer	16	16.5	1,000
3	Normal	17	11	650
3	Normal	12	8.7	700
3	Normal	9	6.25	700
3	Rocking at 25°	13.5	17.75	1,100
3	Rocking at 25°	13	20.5	1,500
3	Normal	10	8.85	885
3	Normal	8	6.5	800
3	Rocking at 25°	13	11.5	900
3	Rocking at 21°	13	15	1,150
3	Rocking at 18°	13	14.325	1,100
3	Schaefer	11	17	1,600
4	Normal	11.5	5.1	470
4	Rocking at 25°	14	4.75	325
4	Normal	15	6	400
4	Rocking at 25°	13	9.5	700
4	Rocking at 21°	13	7.5	600
4	Rocking at 21°	13	7.5	600
4	Normal	11	5	450
4	Normal	13	5.375	400
4	Rocking at 25°	13	5.875	450
4	Rocking at 32°	14	8.75	600
4	Rocking at 15°	14	4.375	300
4	Normal	12	6	500
4	Schaefer	13	6.625	500
5	Normal	15	4.2	300
5	Normal	16	6.42	340
5	Rocking at 25°	15	9.125	600
5	Rocking at 32°	14	7.125	500
5	Rocking at 15°	15	5.625	370
5	Schaefer	14	9.75	700
6	Normal	20	9	450
6	Both-Nuffield	20	10.5	525

TABLE II. (KILLICK, COWELL AND CROWDEN).

<i>Subject</i>	<i>Type of respiration</i>	<i>Resp. rate</i>	<i>Ls. air expired per minute</i>	<i>c.c. air expired per breath (tidal air)</i>
5	Silvester	12	11	917
5	Schaefer	12	7.3	610
11	Silvester	15	11.3	750
11	Schaefer	15	11.8	790

TABLE III. (SCHAEFER).

<i>Type of respiration</i>	<i>Resp. rate</i>	<i>c.c. of air per breath (tidal air)</i>
Normal	13	490
Normal	12.5	420
Silvester	12.5	180
Howard	13.5	300
Marshall Hall	12.5	250
Schaefer	13	520

ratory paralysis ; these workers (Killick, Cowell and Crowden, 1939, and Schaefer, 1905) also worked with medical students ; therefore these results are comparable to theirs and, as the methods of artificial respiration they investigated have proved excellent in actual practice, it follows that, if these results are comparable, this method will be found serviceable in practice.

The point does not seem to have been realized before that, when the subject is conscious and in possession of normal respiration, it provides no test of the efficiency of an apparatus or a method of artificial respiration to obtain a normal tidal air. For, in such a case, how is one to know that the method or machine is working at all and that the normal figures are not due to conscious or unconscious co-operation on the part of the subject of the experiment ? In testing a method or apparatus on conscious subjects breathing normally, it is necessary to show that the normal tidal air can be exceeded or even doubled ; then it is more likely that the excessive respiration of the subject at rest is due to the method or machine.

The expired air was collected through a Douglas bag and measured by being passed through a spirometer. A period of unmeasured breathing was permitted first in order to accustom the subject to breathing through valves ; the subject's normal resting expired air was collected, two or three times in each case, so as to form a control. The air was always collected for two or three minutes. In some cases the effect of altering the angle of tilt that the stretcher makes with the ground has been investigated and a comparison with the Schaefer method of artificial respiration and with the Both-Nuffield respirator has been made.

Table I shows my results ; Table II are those of Killick, Cowell and Crowden ; Table III are those of Schaefer.

It will be seen from Table I that the normal tidal air can be increased by means of this respirator ; in one case the tidal air on the respirator was four times the subject's normal. It will also be seen that as small an angle as 25° is perfectly adequate ; as far as I can find out, this angle has not previously been investigated, it being assumed that an angle of 50° to 60° was necessary. The fact that the tidal air varied in proportion to the angle the subject was rocked through would tend to show that the respiration was due to the apparatus and not to co-operation on the part of the subjects ; for, supposing that this alteration had been due to conscious alteration of the depth of respiration, it would have to be supposed that the subjects had a most fine conscious control over the amount they expired in three minutes. Also noteworthy is the efficiency of Schaefer's method of artificial respiration ; it is remarkable that the originator did not himself produce a tidal air comparable to that obtained by Killick, Cowell and Crowden or myself. The abnormally large amount of tidal air easily obtained by this method, or even by this simple form of rocking artificial respirator, shows that the danger of artificial respiration is over-ventilation ; so much CO_2 may be washed out of the blood-stream that the normal stimulus to respiration is absent ; thus in a case of asphyxia this would effectively prevent spontaneous activity of the respiratory centre. One cannot help wondering if as many people have been killed by this very efficient method of artificial respiration as have been saved.

SUMMARY.

A simple apparatus for performing artificial respiration is described.

The results of testing the apparatus on students are given and they are compared with those of other workers.

I would like to take this opportunity of thanking Private E. R. Alexander, who did the drawings so well, Brigadier Riddoch for his help and advice, Professor Samson Wright for his advice and for the use of his laboratory and students, Dr. D. Slome for help during the experiments and Colonel Wallace Benson, *C.B.E.*, *D.S.O.*, for his help and for permission to forward this paper.

REFERENCES.

- EVE, F. C. (1932). *Lancet*, **2**, 995.
 KILLICK, E., COWELL, E. M., and CROWDEN, G. P. (1939). *Lancet*, **2**, 897.
 SCHAEFER, E. S. (1905). *Proc. Roy. Soc.*, Ed. **25**, 39.

TWO CASES OF LEPTOSPIROSIS ICTEROHÆMORRHAGICA (WEIL'S DISEASE).

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WEIL'S disease was common in the trench warfare of the 1914-1918 war. In civil life it is recognized as an occupational disease in those trades, such as sewer work, canal work and, in Aberdeen, fish-portering, where contact with rats is common. Outbreaks have occurred in this war in the troops in Northern Ireland.

The two cases described came from a Battle Training School in East Anglia. Both soldiers had made frequent use of a swimming pool formed by damming a stream. A mile above the dam the stream passed by a farm which was heavily infested with rats. This was undoubtedly the source of infection. Both men were admitted to a Military Hospital on the same day, September 6, 1942.

Case 1.—Gnr. B., aged 21. On September 5 he was taken ill with a violent attack of diarrhœa and vomiting and cramping pains in the abdomen and limbs. On admission he had fever of 101° F. and a pulse rate of 108. Congested eyes and a furred tongue were the only abnormal appearances. As the fever and vomiting continued the routine for investigation of P.U.O. was instituted. On September 10 (5th day) epistaxis started and a few petechiæ appeared on the chest wall. As he had voided no urine for twenty-four hours a catheter was passed but yielded only 2 ounces of dark urine which contained bile pigments but no other abnormal constituent. Intravenous glucose saline was started at once. That evening orange-tinted jaundice of the skin and conjunctivæ developed. The liver was not palpable. Blood was taken for a guinea-pig inoculation.

By September 12 (7th day) he was passing urine normally. The jaundice was deeper but the temperature had fallen to normal and his general condition had improved; W.B.C. 12,200 per c.mm.; polymorphs 91 per cent. Blood culture sterile. Agglutinations, T.A.B. positive 1/125.

All went well for three days but on September 15 (10th day) the first of a series of complications developed. He complained of severe abdominal pain, colicky in nature, and bad enough to require morphia. The temperature remained normal but the pulse rose to 110. A few hours later he passed a number of stools, consisting almost entirely of blood, followed by a profuse hæmatemesis. The tongue became dry and coated with a brownish fur. As the hæmoglobin was 45 per cent (Haldane) a drip blood transfusion was started and he was also given 20 c.c. antileptospiral serum intravenously.

Hæmorrhage continued from the bowel and nose for the next four days. He was delirious and obviously gravely ill throughout this period. In addition to blood he was given daily 60 c.c. antileptospiral serum intravenously and 6 c.c. Kapilon (vitamin K) intramuscularly but without any significant improvement in his general condition or in the blood count, as the following figures show:

September 16: Hb. 36 per cent, R.B.C. 2.2 million per c.mm.

September 19: Hb. 22 per cent, R.B.C. 790,000 per c.mm.

September 20: Hb. 46 per cent, R.B.C. 1.76 million per c.mm.

On September 16 (11th day) leptospiræ were found in the blood serum.

On September 17 (12th day) the blood urea was 216 mgm.‰, but, by the 20th (15th day), it had fallen to 150 mgm.‰. Neither at this time nor throughout his illness were casts found in the urine.

On September 19 (14th day) the pulse rose to 120 and a harsh to and fro murmur was heard along the left border of the heart. It suggested pericardial friction but may have been due to the profound anæmia.

On September 21 (16th day) the hæmorrhage stopped, the temperature fell to 100° F. and there was a little improvement in his condition. Hb. 45 per cent, R.B.C. 1,890,000 per c.mm.

The blood transfusion was stopped. On this day leptospiræ were found in the patient's urine. Also the guinea-pig which had been inoculated with his blood died. Post-mortem showed jaundice, hæmorrhages in the lungs, congested suprarenals and leptospiræ were found in the peritoneal fluid.

Two days later (September 23, 18th day) he complained of pain in the right chest. The temperature rose to 101° F. and the respirations to 30. Pleural friction was heard in the right axilla. The next day (September 24), he became intensely dyspnoic and cyanosed. There were signs of a spontaneous pneumothorax on the right which was confirmed radiologically. 1,200 c.c. air were aspirated from the right pleura with immediate relief. However early on September 25 the symptoms recurred. A diagnosis of valvular rupture of the pleura was made and an under-water drain was inserted into the right pleura. The blood count was still very low (Hb. 38 per cent, R.B.C. 1,340,000 per c.mm.) and a drip transfusion was started. By September 27 (22nd day) he had improved and on September 29 (24th day) he was afebrile, not unduly dyspnoic and the jaundice was fading. The intrapleural drain was removed. The blood count now was Hb. 40 per cent, R.B.C. 2.2 million per c.mm. Blood urea 144 mgm.%. The improvement was only temporary. On October 2 (27th day) he was very much weaker although the temperature was now normal and the blood urea had fallen to 80 mgm.%. The blood count was unchanged. He was given another blood transfusion and intramuscular injections of Hepatex but again with no significant change in the blood picture.

On the morning of October 7 (32nd day) he became suddenly dyspnoic and died within a few minutes.

At autopsy the findings were :—

- (1) Severe emaciation and generalized jaundice.
- (2) Thorax : The right pleura was bulging. When it was opened air escaped. The heart was displaced to the left and the lower lobe of the right lung was completely collapsed. The right upper lobe showed compensatory emphysema and in the region of the apex there were four emphysematous bullæ each about the size of a pea. One of these bullæ showed signs of recent rupture. The lower lobe of the left lung was congested.
- (3) Heart : There was no evidence of pericarditis. The myocardium was soft and friable and the right auricle and ventricle were dilated. The coronary arteries were normal. There were a few small, firm verrucæ on the mitral valve suggesting an old rheumatic infection but there was no stenosis or incompetence.
- (4) Liver : The liver weighed 64 ounces. It extended 4 in. below the right costal margin and was rather firm. On section the cut edges everted and the liver surface had a nutmeg appearance. The gall-bladder was dilated and filled with thick bile. The bile ducts were patent as far as the ampulla of Vater.
- (5) The spleen was enlarged and "septic."
- (6) The kidneys each weighed 8 ounces. The cortex and columns were jaundiced and the pyramids were congested. The pelves and ureters were normal. The bladder contained jaundiced urine.
- (7) The suprarenals were congested.
- (8) The stomach was dilated and contained greyish fluid. There were numerous superficial erosions and hæmorrhages on the mucosal surface.

Owing to circumstances beyond our control microscopical sections were not obtained.

The immediate cause of death was thought to be a tension pneumothorax following rupture of an emphysematous bulla.

The course of the disease in brief was as follows :—

September 5 : Onset with fever, vomiting, diarrhœa and cramp.

5th day : Suppression of urine ; epistaxis and petechiæ ; jaundice.

7th day : Afebrile.

10th day : Hæmorrhage from the bowel and nose.

11th day : Recurrence of fever ; leptospiræ found in the blood.

12th day : Blood urea 216 mgm. %.

16th day : Leptospiræ found in the urine ; hæmorrhage ceased but anæmia persists.

19th day : Spontaneous pneumothorax.

22nd day : Jaundice starting to fade.

32nd day : Death.

For treatment he was given glucose and alkalies by mouth. He also received 12 pints of glucose saline intravenously, 12 pints of whole blood, 240 c.c. of antileptospiral serum, 16 c.c. of Kapilon, iron by mouth and injections of Hepatex.

Case 2.—L/Bdr. R., aged 20. Onset September 4, 1942, with headache, vomiting and cramps in the limbs. On admission (September 6th) he had fever of 102·6° F. and a pulse rate of 98. Apart from congested eyes and enlarged inguinal glands there were no abnormal findings. Epistaxis started and a few petechiæ appeared on September 9 (5th day), jaundice and bile in the urine developed on September 11 (7th day). As in the first case the jaundice was of a bright orange tint. The pyrexia continued until October 7 (33rd day) terminating by lysis. The jaundice had faded completely by October 5. By October 20 he was fit enough to go to a convalescent home. The illness throughout was less severe than in the first case and never gave cause for anxiety.

The following investigations were performed :—

September 12 : W.B.C. 11,600 per c.mm. Polymorphs 71 per cent. Blood culture sterile. Agglutinations, T.A.B. and *Br. abortus* negative.

September 14 : Icterus index 31.

September 16 (12th day) : Leptospiræ found in blood serum. Hb. 78 per cent. R.B.C. 3,590,000 per c.mm.

September 22 (18th day) : Leptospiræ found in urine. Post-mortem on guinea-pig inoculated with the patient's blood showed hæmorrhages in the lungs and slight jaundice.

October 9 : Hb. 89 per cent. Blood urea 56 mgm.%.

Symptomatic treatment alone was given.

DISCUSSION.

No attempt will be made to summarize the very extensive literature. Two recent papers by White and Prevost (1941) and Graham and Nelson (1941) contain useful information. An excellent account is also given in the War Office Memoranda on Tropical Diseases (1942) and the treatment is described in the *Army Medical Directorate Bulletin* No. 11 (1942).

The course of the disease falls into three stages : the febrile, usually lasting eight to ten days, the icteric and the convalescent. Common symptoms and signs at the onset are conjunctivitis, gastro-intestinal disturbance, headache and myalgia. All these were present in the two cases described and the conjunctivitis was particularly pronounced although its significance was not recognized at the time. Enlargement of the lymphatic glands sometimes occurs as in Case 2. White and Prevost found pruritus a constant, severe and distressing symptom in the American cases. The War Office Memorandum states that it is uncommon and it was absent in both of these patients.

Hæmorrhagic cases, such as these two, are always severe but are fortunately rare. It was probably the reason for the unduly prolonged pyrexia. The first patient was doubly unfortunate in having an associated bullous emphysema, rupture of one of the bullæ leading to the tension pneumothorax which was the immediate cause of death. However, it is doubtful if recovery would have occurred apart from this, as the liver was grossly damaged and the anæmia had proved resistant to all forms of treatment. It is interesting that although in both patients the blood urea was raised yet casts were never found in the urine. This was not due to insufficient search as the urine was examined daily both for leptospiræ and casts.

Diagnosis rests finally on recovering the leptospiræ either directly from the patient's blood or, more usually, after the inoculation of blood or urine into a guinea-pig. Graham and Nelson state that an alkaline urine is essential for success if the latter is used. White and Prevost advise the following technique for finding the leptospiræ in the blood :—

A 10 c.c. glass capillary tube is filled with blood and one end is sealed. It is then centrifuged with the sealed end downwards for five to ten minutes. The tube is removed and broken off just on the serum side of the cellular deposit. The clear serum is now expressed with a

vaccinator bulb on to a coverslip and examined in the routine way. They have found the organism in the blood up to the 61st day and in the urine from the 10th to the 60th day. In these two cases leptospiræ were found in the blood on the 11th and in the urine on the 16th day.

The agglutination test according to White and Prevost is positive after the 10th day but it is not entirely reliable owing to the antigenic variations of leptospiræ. It was negative in both cases.

Treatment is well described in the A.M.D. Bulletin. Specific treatment, to be effective, must be started early and in full doses (60 c.c. daily). It was not given until the 10th day in Case 1 and proved of very doubtful efficacy. Kapon also proved disappointing in arresting the hæmorrhage. White and Prevost advise liver for the resultant anæmia. The very severe anæmia in Case 1 was equally resistant to blood transfusion, iron and liver.

SUMMARY.

Two cases of Leptospirosis icterohæmorrhagica are described. Both were hæmorrhagic. In one, the more severe of the two, it was associated with bullous emphysema and tension pneumothorax, causing death. An autopsy was performed.

Many thanks are due to Lieutenant-Colonel J. M. Elliott, R.A.M.C., for permission to forward the account of these two patients, to Brigadier R. Priest for advice on treatment and, on the compilation of the article, to Major A. G. Emslie, R.A.M.C., and Major M. Harker, R.A.M.C., for help in carrying out the treatment, and to Lieutenant Pivawer, R.A.M.C., for the pathological work.

REFERENCES.

- Army Medical Directorate Bulletin No. 11* (May 1942), The War Office, London.
Memoranda on Medical Diseases in Tropical and Sub-Tropical Areas (1942), His Majesty's Stationery Office, London.
GRAHAM, N. C., and NELSON, M. G. (1941). *Ulster med. J.*, **10**, 111.
WHITE, J. J., and PREVOST, J. V. (1941). *Annals intern. Med.*, **15**, 207.
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VERTEBRAL AND SACRO-ILIAC STRAIN IN THE SOLDIER.

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Two very common causes of disability which present themselves to the medical officer are lower lumbar and sacro-iliac pain. Often by the soldier's own volitional statement but more frequently only by careful questioning this is found to have been initiated directly as the result of some considerable physical strain. The man has been cranking a Diesel engine or has lifted a heavy weight or he has been subjected to some one of the other many stresses which fall to the serviceman's lot.

In the mild cases which come along the usual procedure is to recommend a few good liniment rubs and hope that the counter-irritation and physical stimulation may have the effect of relaxing a slight muscular spasm. More severe cases, those in which there is obviously some definite limitation of movement in the spine, may be accommodated in sickbays or reception stations where similar treatment combined with rest may effect a cure.

If removal of the symptoms does not take place within a few days the soldier is transferred to a hospital and, if this is equipped for the purpose, he will there be treated by helio- and radio-therapy and any other physiotherapeutic measures which are advocated by the attending consultant. Such measures may produce a complete and permanent alleviation of the symptoms. If so all is well.

But many hospitals have neither the personnel nor the equipment to carry out suitable physiotherapeutic treatment and the patient may be left to lie in bed, perhaps for weeks, before he is ultimately returned to his unit, with the pain possibly alleviated but not cured. In the course of time he reports sick again and continues to do so until suitable treatment is recommended and becomes available to him.

The object of this article is to suggest the importance of obtaining an accurate history of the onset of the trouble and of inquiring, in particular, to possible circumstances of physical strain immediately preceding acute or chronic lumbar or gluteal pain. If such history is given it will provide a guide as to the diagnosis and probably as to the remedy.

Patients who give a history of strain immediately preceding an attack of lower lumbar or gluteal pain may be placed in three classes.

Those in which (i) the erector spinæ has been strained with the possible rupture of some muscle fibres ; (ii) the lumbar spine has been rotated on the sacrum to such an extent that it has remained in a state of semi-subluxation ; (iii) one or other of the ilia has become rotated on the sacrum posteriorly and has similarly remained in a state of semi-subluxation.

As to the first class little comment need be made. It comprises that group of patients which presents no particular therapeutic difficulty. They are cured by rest and normal physiotherapeutic measures. The diagnosis has been simply backache or lumbago as the medical officer chooses to call it. They may have had some strain of the erector spinæ and the appropriate treatment has been given.

The cases which come under the second and third classes are more perplexing but their diagnoses may be made within a certain measure of accuracy.

There is (i) The history of physical strain ; (ii) limitation of spinal movement in one, or all, directions ; (iii) tenderness and rigidity of the erector spinæ on the affected side, and (iv) more marked tenderness immediately to one side or the other of the spinous process of the 5th lumbar vertebra or over the sacro-iliac articulation on either side.

The diagnosis is that of either lumbo-sacral or sacro-iliac strain which actually amounts to a partial subluxation of the joint involved.

A case which is illustrative in this regard is that of a young and otherwise healthy soldier who was being invalided home from Palestine with chronic lower lumbar and sciatic pain.

His trouble had originally developed whilst playing football and he was admitted to hospital in Egypt. After complete investigation and a long period of rest he was returned to his unit as fit. Shortly afterwards the symptoms re-developed. He strained his back again whilst using the troublesome "kick-start" of a motor-bicycle.

It was then decided to send him home. On board the hospital ship he was given palliatives and complete rest for about two weeks with no result.

Finally it was considered that he might be helped by a manipulation of his lower lumbar spine. This manipulation was performed and he was able immediately to pronounce himself fit and left the ship as a walking case without any symptoms whatever. His chief concern was that he would not be compelled to be taken ashore as a stretcher case.

If the cause of this man's complaint, the spinal strain, had been recognized more early and had suitable manipulative treatment been given to relieve it he could have returned to duty speedily, properly cured, and would have remained an active soldier. Man-power would have been conserved not only in so far as he himself was concerned but also in respect of the personnel necessary for his transport to and his treatment in the hospital ship.

The diagnosis in this case was based solely on the clinical findings. *As in all similar cases there was negative radiological evidence.* But there was definite tenderness to the right of the spinous process of the 5th lumbar vertebra and slight rigidity of the erector spinæ of the right side. These signs, together with the history and in the absence of other pathological findings, were sufficient on which to form the diagnosis of lumbo-sacral strain.

The manipulation which was carried out is relatively easy to perform. The patient lies on the affected side as close as is possible to the edge of the operating table. The uppermost leg is flexed on the thigh to the extent that the dorsum of the foot is brought into contact with the popliteal space of the lower leg. The upper leg and foot are held in this position by an assistant. The operator now makes three contacts with the patient. Assuming that the patient is lying on his right, the affected, side the operator, standing as closely as possible to the operating table, places (i) his left hand on the left shoulder of the patient; (ii) the fingers of his right hand firmly in contact with the right of the spinous processes of the patient's lumbar vertebrae, and; (iii) his right knee over the knee of the patient's flexed left leg.

Then with a synchronization of movement three forces are applied. The patient's left shoulder is forced backwards by the left hand; the lumbar spine is pulled forwards by the fingers of the right hand and at the same time the operator's right knee presses down the patient's left thigh.

These three forces, *which must be made simultaneously*, have the effect of rotating the lumbar spine on the sacrum in the desired direction; in this particular instance, from right to left.

It should not be difficult to perform the manipulation after a little practice and no ill-effects will result from its trial, provided always that the operator has an adequate comprehension of his own physical strength in comparison with the muscular resistance of his patient.

Sacro-iliac strain is not so frequent as lumbo-sacral strain but it is more commonly recognized and acknowledged both in the acute and chronic stages.

A classical case has recently come under observation. A man had been coiling wire on a very heavy drum and, whilst making a strenuous effort to move this, he suddenly felt and heard a very distinct snap in his back. He collapsed immediately and, as he was unable to walk or to straighten himself, he was carried to his bed in his quarters. Subsequently he was moved to a reception station. Examination revealed acute tenderness over the right sacro-iliac joint and definite spasm of the erector spinæ on the affected side. The usual palliative measures were adopted and were followed by only slight amelioration of his symptoms. He was admitted to hospital on the fourth day. X-ray, as was expected, showed no abnormality.

On the history on the case, together with the corroborative physical signs, it was decided to perform a manipulation which was carried out by the attending orthopaedic surgeon at the hospital.

The manipulation is somewhat similar to that previously described only it is particularly to be noted that the patient lies on the unaffected and not the affected side. In this case,

where the right side was affected, the patient was placed on his left side and his right thigh flexed on the trunk to an angle of 45° , the leg being similarly flexed on the thigh. Standing behind the patient the operator now places his left hand over the right shoulder whilst the heel of his right hand makes contact with the ilium posteriorly. Then with a synchronized movement he pulls the patient's shoulder towards him and presses the ilium away from him. This has the effect of rotating the ilium forwards and correcting the strain.

As happened in this case a very distinctly audible snap is heard and the ilium regains its normal alignment with the sacrum. This soldier was very much easier on the day following the operation and suffered only from the residual symptoms of the original injury. If the manipulation had not been performed the probability is that peri-articular changes would ultimately have taken place with resultant fixation of the joint in a position of abnormal adjustment. Chronic discomfort and disability would have occurred as was evidenced in the case first mentioned.

The empiric nature of the treatment employed in both of these cases must be stressed. *In neither was there any radiological confirmation of bony mal-adjustment* but in each there was (i) The history of strain ; (ii) clinical evidence of localized tenderness and rigidity and, (iii) the audible and palpable return of a bone to its normal alignment on manipulation.

The incidence of similar cases is probably much more common than is usually recognized. The diagnosis is easy and the manipulative technique not difficult to acquire by practitioners of practical ability.

To epitomize the manipulative idea : strain of a spinal or pelvic joint may be relieved by applying force in the opposite direction to that in which the joint has been strained. Careful questioning as to the exact position of the patient on the occasion of his strain, the work he was doing and the direction of the forces involved in the causation of the strain, help in coming to a diagnosis. But the main and simple signs are those to which allusion has previously been made.

Early recognition of the cause of the disability and the presentation to the orthopædic surgeon of the facts which have been gathered should greatly expedite the return to duty of many men who otherwise might be regarded as obscure cases of backache or sciatic neuritis and thus remain as chronic ineffectives for an indefinite length of time.

THE IMPORTANCE OF OTOLOGICAL EXAMINATION IN HEAD INJURIES, INCLUDING REFERENCE TO ITS RELATION TO RADIOLOGICAL INVESTIGATION.

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AND

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THE significance of hæmorrhage from an ear following a head injury is universally recognized but, in its absence, impairment of function of the auditory or vestibular mechanism is commonly overlooked until, at a later date, the patient complains of deafness or some symptom suggestive of vestibular upset. All too frequently the first otological examination is made at some considerable period after the injury. By this time the expression of opinion as to the relationship of the accident to the disability found presents considerable difficulty. The increasing frequency of road accidents and the present hazards of war result in ever-increasing numbers of cases in which this unsatisfactory circumstance occurs.

Our present object is to plead for a wider recognition of the importance of reasonably early otological examination in cases of head injury :—

(1) As an aid in arriving at a more exact appreciation of the nature and extent of the injury from the otological findings themselves.

(2) In respect of the help which it may be possible to give to the radiologist in his search for a basal fracture involving the temporal bone.

(3) In facilitating the giving of a prognosis at subsequent examinations in cases of impairment of hearing and vestibular function.

(4) In assessing attributability in respect of compensation or pensions.

For more than a year before the outbreak of war, one of us (R. B. L.), as a result of experience of several cases of "late" deafness following head injuries, was afforded the opportunity of examining all such cases at least once during some period of their sojourn in one particular hospital. Details are not available under present circumstances but the proportion of cases found to be suffering from unsuspected impairment of hearing and vestibular function was striking.

Writers on this subject stress the importance of co-operation between the surgeon and otologist but, unfortunately, the practice still appears to be far from universal. Among others, Coleman (1937 [1]) states: "The welfare of the patient with a fracture of the mastoid or petrous temporal is best protected when there is close co-operation between otologist and neuro-surgeon. These injuries frequently come within the domain of both and treatment without appreciation of this fact is not conducive to the best results." Collier (1940 [2]) states: "It is the duty of otologists to advise the casualty service that routine examination of the ears should be made as soon as the general condition of the patient permits." Zacks (1939 [3]) concludes that "every patient with injury to the head subjectively disturbed should be examined neuro-otologically as soon after injury as possible and re-examined occasionally for approximately one year, to determine the integrity of the kinetic-static and the auditory mechanism" and further states that "while a definite objective syndrome may not be produced, vestibular tests are of inestimable value in offering a possible explanation for subjective symptomatic complaints." Alexander and Schall, quoted by Grove (1939 [4]) found objective evidence of hearing or vestibular damage in 10 per cent of 287 cases of head trauma. Vestibular disturbance was more frequent than cochlear in this series. We have been disappointed to find no reference to this subject in a discussion

on rehabilitation after injuries to the central nervous system [5], but Symonds (1942 [6]), in a recent discussion on differential diagnosis and treatment of post-contusional states, refers to 1,020 cases of closed head injury in which true vertigo was inquired for and was found present in eighty-two. In twenty-nine of these it was associated with deafness of middle or inner ear type, dating from the injury. In four others there was a history of bleeding from the ear or tinnitus in the early stage. He suspects "that if inquiry as to the presence or absence of deafness and tinnitus, on the one hand, and diplopia and nystagmus on the other, were more vigorous in the early stages, we should have fewer cases in which corroborative evidence of labyrinthine or brain-stem injury is lacking."

Anatomical and Pathological Considerations.—Fractures of the skull (excluding those involving the facial bones) fall under two main anatomical headings: fractures involving the vault and fractures involving the base. These two varieties are combined in a large number of cases and cannot be entirely separated. Hence Stewart (1921 [7]), in an analysis of 408 fractures of the vault, found that 210 were linear and of these 70 per cent extended to the base. He states that the commonest site of basal fracture is in the middle fossa (also Logan Turner, 1936 [8]).

Fractures involving the petrous temporal bone are broadly classified as *longitudinal* and *transverse*, the former being much more common. Another type of great importance is fracture of the bony labyrinth, which can only be proved satisfactorily by the microscope but may be seen by radiological examination. Otologists are familiar with the features of these different types which are fully described in the textbooks. Colledge (1940 [9]) gives a valuable résumé of the subject.

Typically, longitudinal fractures result in damage to the middle ear while transverse fractures involve the labyrinth or inner ear. Some degree of inner ear, in addition to the middle ear, type of deafness frequently occurs in association with longitudinal fractures (Schönbauer and Brunner [10], Grove, 1940 [11]). An oblique type is sometimes referred to which combines the main characters of both the longitudinal and the transverse fracture. Fractures of the skull which do not directly involve the temporal bone may affect hearing and it has to be borne in mind that the mildest form of trauma may cause the most severe functional disturbance and vice versa [4] (also Denker and Kahler [12]). The possibility of damage to the auditory nerve itself and its central connexions has also to be borne in mind; Zacks [3] concludes that vestibular abnormalities offer an organic explanation for many so-called functional disturbances and points out that findings similar to those associated with tumour of the cerebello-pontine angle, when present, are significant and occur in a fairly large percentage of cases.

Injuries to the tympanic membrane and labyrinth damage resulting from explosions will not be discussed here.

RADIOLOGY.

Unlike fractures involving the long bones, skull fractures are usually not directly related to the clinical picture in the initial stages; this clinical picture depending upon the degree of damage to the brain. Later, after the initial phase has passed, various sequelæ may become apparent, including those due to involvement of centres of special sense and nerves passing through or contained in bony cavities and canals in the base.

As a general rule, X-ray examination of the skull in head injuries is not undertaken until the patient has recovered from the initial effects of the trauma. This policy is adopted for two main reasons: (A) The undesirability of moving the patient during this phase. (B) The difficulty in obtaining satisfactory radiographs in an unconscious or semiconscious patient. The examination, moreover, is then only undertaken in many cases for the purpose of prognosis rather than as a guide to active treatment such as is the case in a fracture of, say, the shaft of the femur.

It will be admitted that in many cases of head injury radiographs are asked for as a routine and without very high hopes of demonstrating a fracture, even though clinically the presence of such a fracture seems probable. The matter is then frequently allowed to

drop with the report "no radiological fracture seen" and it is accepted that medico-legal requirements have thus been met.

With particular reference to an appreciable proportion of cases which show clinical evidence of auditory or vestibular disturbances we believe that further, and if necessary repeated, radiological investigation is desirable and should be undertaken.

In the cases so far investigated by us, projections used to demonstrate the bony structure of the base have included: Vertico-mental, Towne, Schüller (lateral mastoid), Stenver, Mayer, Occipital, several other types of oblique projections and stereoscopic views.

To multiply these to excess in any one case involves unnecessary wastage of material and time, not to mention annoyance to the patient who is still suffering from the effects of his head injury. It is therefore considered that:—

(1) Special X-ray investigation for fractures involving the middle or posterior cranial fossæ should only be undertaken after clinical investigation which includes the otological findings.

(2) The information received by the radiologist should, whenever possible, give him a clear understanding as to the suspected site and extent of the lesion for which he is searching.

We will not at present attempt to discuss the relative merits of different projections or the particular indications for their use.

CASE RECORDS.

All cases are examples of blunt injury due to road accidents, falls, etc.

It is regretted that conditions of active service have prevented the satisfactory reproduction of X-ray photographs.

No facilities for audiometric investigation have been available.

Case 1.—Blunt head injury. Normal tympanic membranes. Unilateral total deafness discovered six weeks later.

Lance-Corporal H., aged 26. Complains of deafness in left ear since sustaining what he was told was concussion, six weeks ago. Period of amnesia probably only about five minutes. Was in hospital for two weeks and has felt otherwise fit since then. Ears were not examined nor was he X-rayed while in hospital.

Examination.—Both drums normal. Complete deafness in left ear (with right ear excluded with noise apparatus). Slight inner ear deafness in right ear. Slight spontaneous rotatory nystagmus to right with slight past-pointing to left. No other neurological signs present.

(Existing circumstances rendered further investigation impracticable nor has it been possible to obtain any subsequent information about this case.)

Case 2.—Blunt head injury with aural discharge—resolution, but persistent deafness. Severe unilateral mixed middle and inner ear deafness with loss of vestibular function discovered three years later. No radiological evidence of fracture of temporal bone.

Serjeant M., aged 38. While recovering from otitis externa, found to be very deaf in left ear. Gives a history of sustaining a head injury in a lorry accident three years previously but had no recollection of details of the accident or of circumstances immediately preceding it. He was unconscious for several days. His left ear discharged thereafter but it was never examined or treated and it dried up in a few weeks but he has never heard well with it since.

Examination.—Right drum normal. Left drum small posterior scar. Hearing in right ear normal. Mixed middle and inner type of deafness in left ear, in which he can only hear a raised voice close up (with right ear excluded with noise apparatus). No spontaneous vestibular signs present. Cold caloric test: right ear—normal reactions in fifty seconds. Left ear—no reaction after four minutes. X-ray: lateral mastoid projection—slight relative obscurity of left mastoid air cells. No evidence of fracture seen. Stenver projection—no evidence of fracture seen.

Comment.—In neither of these cases had the ears been previously investigated yet, from the findings here recorded, the importance of such an examination soon after accident is obvious in both.

Case 3.—Blunt head injury. Fracture of parietal and squamous temporal region. Normal hearing.

Corporal M., aged 29. Head injury due to being thrown from a horse. Remembers incidents up to the actual fall but period of amnesia is very uncertain. X-ray: lateral skull projection—fissure fracture of left parietal and squamous temporal bones. Examination: both drums normal. Hearing normal in both ears. No symptoms or signs of vestibular disturbance.

Comment.—This case demonstrates the value of negative otological findings where there is radiological evidence of a fracture of the vault. Further radiological investigation was unnecessary.

Case 4.—Blunt head injury with hæmorrhage from left ear and also right hæmatotympanum with no external hæmorrhage.

Private R., aged 34. Head injury due to a car accident. Remembers nearly reaching destination but no details of events leading to the accident. On admission to hospital: conscious, drowsy, bleeding from left ear.

Examination.—Left external ear contains blood-clot and fresh blood. Right drum intact but bulging, with blood present in the middle ear (hæmatotympanum). Pure middle ear type of deafness present in both ears. X-ray: antero-posterior and lateral projections—no fracture seen. (Further radiological investigation was not practicable.) Eight weeks later—right drum normal. Left drum shows a small posterior scar. Hearing in right ear normal, slight middle ear deafness still present in left ear.

Comment.—In this case the lesion in the right ear would have been entirely overlooked if routine examination had been omitted.

Case 5.—Blunt head injury with hæmorrhage from left ear which became secondarily infected. Right chronic otitis media. Fracture involving left middle cranial fossa.

Rifleman L., aged 33. Head injury due to lorry collision. Does not remember actual impact. First memory after accident is of waking up in hospital, one and a quarter hours later. Bleeding from left ear on admission.

Examination.—Thirty-six hours after accident: Left ear contains debris and blood-clot. Right ear contains pus with a polypus present. No blood-clot seen—chronic suppurative otitis media. Patient is not sufficiently co-operative to render hearing tests reliable but it is noted that he seems to rely on the *left* ear for hearing. No signs of vestibular disturbance. C.N.S.—no abnormality detected. Sulphonamide given. Two and a half days after accident: left facial paresis noted. X-ray: lateral skull and lateral mastoid projections and stereoscopic lateral view—linear fracture of left parietal region extending through temporal region to middle cranial fossa. Right mastoid is acellular, left is cellular, with no evidence of infection. Subsequently the left middle ear became infected and hearing tests demonstrated pure middle ear deafness in both ears. Four weeks after the accident: left ear dry and facial paresis has recovered completely. Six weeks after the accident hearing in the left ear almost normal. The polypus was subsequently removed from the right ear but it did not become dry and hearing remained poor.

Comment.—This case presents several interesting features:—(1) Had the fracture occurred on the right side, in the presence of a chronic otitis media the desirability of carrying out a mastoid operation would have required consideration. The advent of the sulphonamide drugs would provide a subject for fruitful discussion in this connexion. (2) The occurrence of secondary acute infection in the left ear actually did present this very problem, in which X-ray proved helpful—(a) by demonstrating a cellular mastoid, this making the presence of long-standing infection improbable, (b) by demonstrating no evidence of mastoid infection at the time of examination. (3) facial paresis. Schönbauer and Brunner [10] state that the prognosis is usually favourable in this (longitudinal) type of fracture, whereas in transverse fractures, it is bad. Grove [11] states that late paralysis, as in this case, is due to hæmorrhage into the nerve canal. Coleman [1] finds that it is rarely permanent and usually appears a few days after the injury. O'Connell (1941 [13]) also finds that the prognosis seems usually to be good. Stewart [7] found three cases of persistent facial palsy out of 295 who recovered from fractures of the skull.

Case 6.—Blunt head injury with ? hæmorrhage from ear. Otitis externa prevented inspection of drum. Fracture involving middle cranial fossa. Persistent unilateral middle ear deafness.

Lance-Corporal F., aged 28. Fell and struck his head on a stone floor. He had not felt well and had gone to bed but got up to get a hot drink. While doing so he felt faint and next remembers waking up in hospital several days later. Dried blood noted in left ear on admission to hospital—? from scalp wound. X-ray: lateral projection—fracture in left posterior parietal region passing down towards middle fossa.

Examination (two weeks after injury).—Right drum normal, left ear—otitis externa, very swollen meatus, no blood-clot present, inspection of drum impossible. Hearing normal in right ear. Pure middle ear deafness present in left ear in which whisper is heard at one foot. No signs of vestibular disturbance. Further X-ray examination: Schüller projection—fissuring of left parietal region involving squama. A small fissure of squama passes down into middle fossa. Stenver and Mayer projections—show no evidence of fracture. Seven weeks after injury—left drum almost normal with small posterior scar. Hearing unchanged.

Comment.—The presence of otitis externa rendered an accurate assessment of the ear condition difficult in this case and further X-rays proved of particular value in the circumstances.

Bleeding from an ear after a blunt head injury is almost pathognomonic of fracture of the temporal bone. Grove (1939 [14]) discusses this subject in detail and we would here only mention two possible sources other than the middle ear itself: (1) the possibility of blood entering the external ear from some independent external source of hæmorrhage, as was suspected in this case. (2) injury to the external canal caused by sudden impaction of the mandible against the glenoid fossa.

Case 7.—Blunt head injury with hæmatotympanum but no external hæmorrhage. Fracture involving middle cranial fossa—confirmed at post-mortem.

Private V., aged ? Fell 20 feet from a window. Admitted to hospital unconscious, with a wound 4 inches long in right parietal region. C.N.S.—signs of widespread cerebral lesions causing nearly total motor paralysis affecting cranial (and peripheral) nerves except for some signs of active movements in left arm. X-ray: Skull fracture on right side extending from frontal sinus, backwards through frontal and parietal bones and downwards into the petrous portion of the temporal bone. Left drum normal. Right drum intact, blood present behind the drum which is bulging. Ecchymoses of posterior-superior wall of external meatus. Died in thirty-six hours. X-ray findings confirmed at post-mortem.

Comment.—This case again demonstrates that fracture and hæmorrhage into the middle ear can occur without rupture of the drum.

Case 8.—Attacks of vertigo commencing two years after a blunt head injury. Hearing normal. Marked inequality of right and left vestibular reactions. Fracture involving right middle cranial fossa.

Corporal C., aged 30. Fell from a horse in 1934 and was unconscious for about five minutes. He remembers events up to the moment of impact. Two years later he had an attack of vertigo which has since recurred at intervals of several months. Attacks appear to be initiated by stooping and last for one to two minutes. He has never actually fallen during an attack but has to sit down or hold on to something. No headache, nausea or vomiting. Attacks never wake him up from sleep.

Examination.—C.N.S.—no abnormality detected. Both drums normal. Hearing normal. No spontaneous vestibular signs. Cold caloric test: marked delay in reactions on right side compared with left at repeated examinations. X-ray: Stenver projection shows some irregularity of outline of the superior aspect of the right petrous, with a small fissure passing down from the squama into the shadow of the petrous. The appearance suggests a fracture of the middle fossa passing from the squama, medially.

Comment.—The cause of disability is open to doubt but, after prolonged observation the consensus of opinion was that this man's symptoms were related to the injury sustained in 1934, the result being some upset of vestibular function. Epilepsy cannot however be definitely excluded, though from witnesses, attacks have not apparently been associated with tonic or clonic movements. Denker and Kahler [12], quoting Rhese, point out that

the vestibular nerve is more resistant to injuries than the cochlear nerve and therefore if there is normal hearing but decrease of vestibular function the lesion may be regarded as central. A record of the vestibular findings soon after the accident would have been of much value in trying to determine the nature of these attacks. Further X-ray investigation would have been of interest but unfortunately the utilization of additional films did not appear to be justified.

Case 9.—Blunt head injury with fracture involving right middle cranial fossa. Old healed bilateral otitis media. Hearing in left ear normal, mixed middle and inner ear deafness in right ear, with marked relative impairment of right vestibular reactions.

Private C., aged 31. Sustained a head injury in a road accident with laceration of scalp in right parietal region. He remembers no details of the accident and woke up in hospital a few days later. Four days later: C.N.S.—no abnormality detected. No bleeding from either ear has been observed. X-ray 1: lateral projection—double linear fracture running across right temporal and parieto-occipital region. Two weeks after accident patient observed deafness in right ear.

Examination.—Both drums are grossly scarred. Appearances suggest that this is the result of previous suppuration and not of recent origin. Hearing in left ear normal. Mixed middle and inner ear deafness present in the right ear. Hearing in right ear improves slightly after inflation, but spoken voice is only heard close up (with left ear excluded with noise apparatus). No spontaneous vestibular signs present. Cold caloric test: Left ear—normal reactions after twenty-five seconds. Right ear—very transient reactions after ninety seconds. X-ray 2: Stenver projection—fissure involving upper right mastoid region and running forwards into the middle fossa. 3 Schüller projection—fissure in the mastoid previously seen is not confirmed but there is a crack in the adjoining cranium running downwards and forwards into the middle fossa.

Comment.—The middle ear deafness which was present in this case would appear, almost certainly, to have been due to previous middle ear infection while the inner ear deafness, along with the impairment of vestibular function, can reasonably be considered to have resulted from the trauma.

Case 10.—Blunt head injury followed by vertigo. Normal hearing. Inequality of right and left vestibular reactions. Fracture of left mastoid temporal bone.

Serjeant P., aged 41. Struck behind left ear by a metal bar eleven weeks ago. He remembers events right up to the accident. He was unconscious thereafter but does not know for how long. Subsequently he has suffered from vertigo and tinnitus in left ear but has never noticed any deafness. Giddy turns continue to come on suddenly and without warning and last for fifteen to twenty minutes. Always feels persistently giddy whenever he lies on his left side but cannot state in which direction objects appear to move. Has never fallen and does not suffer from nausea or vomiting. Attacks never wake him up from sleep but he cannot sleep on his left side.

Examination.—Both drums normal and hearing normal in both ears. No spontaneous vestibular signs. C.N.S.—no abnormality detected. Blood Kahn negative. B.P. 130/85. Cold caloric test (repeated twice): Right side—normal reactions after forty seconds. Left side—violent reactions in thirty seconds; and he volunteers the information that it reproduces the attacks from which he suffers. X-ray: Stenver projection shows a fissure through the left mastoid passing upwards and forwards into the region of the internal ear.

Comment.—The vestibular hyperirritability associated with this fracture is an interesting feature. Unfortunately further observation was impossible and efforts to obtain subsequent information have been unsuccessful.

SUMMARY.

(1) Attention is directed to the importance of carrying out otological examination in all cases of head injury.

(2) It is suggested that closer co-operation between the otologist and the radiologist would facilitate radiological investigation of fractures of the middle and posterior cranial fossae.

(3) Brief notes of ten cases are given, with comments.

We desire to express our thanks to Colonel A. T. B. Dickson for permission to forward the notes of Cases 1, 2, 3, 4, 6, 8, 9 and 10 and to Colonel H. D. F. Brand for permission to submit Case 5.

Our thanks are also due to Major P. B. Ascroft for asking one of us to investigate and treat Case 5, and to Major W. H. Milligan for his help in the radiological investigation of this case.

We are grateful to Lieutenant J. Schotz for the particulars of Case 7 and for his help in supplying us with a number of the textbooks and original articles to which reference is made.

REFERENCES.

- [1] COLEMAN, C. C. *Trans. Sect. Laryngol. Otol. Rhin., Amer. Med. Assoc.*, 88th Ann. Session, 1937, 58.
 - [2] COLLIER, J. *Proc. Roy. Soc. Med.*, 1940, **34**, 10.
 - [3] ZACKS, M. A. *Archiv. Otolaryngol.*, 1939, **30**, 614.
 - [4] GROVE, W. E. "Laryngoscope," 1939, **49**, 864.
 - [5] JEFFERSON, G. *et al.* *Proc. Roy. Soc. Med.*, 1942, **35**, 295.
 - [6] SYMONDS, C. P. *Ibid.*, 1942, **35**, 601.
 - [7] STEWART, J. W., *Jour. Amer. Med. Assoc.*, 1921, **77**, 2030.
 - [8] LOGAN TURNER, A. "Dis. Nose, Throat & Ear," 1936, 413.
 - [9] COLLEDGE, L. *Proc. Roy. Soc. Med.*, 1940, **34**, 5.
 - [10] SCHÖNBAUER and BRUNNER. "Handbuch der Neurologie des Ohres," Alexander—Marburg.
 - [11] GROVE, W. E. *Archiv. Otolaryngol.*, 1940, **31**, 1, 222.
 - [12] DENKER and KAHLER. "Handbuch der Hals Nasen, Ohren Heilkunde."
 - [13] O'CONNELL, J. E. A. *Lancet*, 1941, December 13.
 - [14] GROVE, W. E. *Ann. Otol. Rhin. and Laryngol.*, 1939, **48**, 120.
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Editorial.

GLANDERS AND TUBERCULOSIS.

WHEN Villemin, that great French Army Medical Officer to whom we owe the first demonstration of the infectivity of tuberculosis, sought, in 1867, to find a comparison between the phthisis of man and a similar malady in animals, he turned naturally to glanders in horses as a ready example of all that was essentially the same in both diseases. In his capacity as Professor of Pathology at the Army Medical School at Val de Grace he had an opportunity of seeing, on the one hand, many splendid young countrymen from the fields of France, brought up to serve in the Guards regiments as the most perfect examples of physical fitness, go down with an acute and fatal tuberculosis while the far poorer material from the streets and slums of Paris lived on, healthy or chronically infected, in close contact with the city type of the disease. Again, the arrival of fine horses from the country districts for the cavalry regiments in Paris was also clearly apparent to him; fine horses hitherto uncontaminated but now brought into contact with others of a less pure environment; into contact with horses having in their lungs the latent infection that is so frequent an episode in glanders; horses that might, by their very presence in the common stables, become a source of acute glanders and rapid destruction to the healthy animals from outside. Here was a comparison indeed! In both diseases the chronic type affecting those in close contact with the crowded communities of cities or the crowded stables of great central depots; in both the frequent sacrifice to the acute disease of healthy individuals from the uninfected country districts when brought into close touch with the chronically contaminated; in both a somewhat similar clinical history: ulceration of the lungs or elsewhere, inflammation of glands, expectoration or a running from the nasal mucous membrane—"chancrage, glandage, jetage" as he puts it to his readers. And had the "mallein" test then been available to veterinarians and the "tuberculin" test at the disposal of the medical profession the comparison would have been closer still. When, in 1912, Whitmore and Krishnaswami discovered, in Rangoon, the glanders-like disease now known as melioidosis, a disease of rodents but transmissible to man, it did not strike us as that here was another which might be confused with tuberculosis. As Topley and Wilson say in their "Bacteriology" "In man the clinical course is brief, death generally occurring within three or four weeks of the onset of symptoms." But we publish in the current number of the *Journal of the Royal Army Medical Corps* an article by Mayer and Finlayson in which a case of this disease, so chronic as to last from June, 1940, to June, 1943, and onwards and characterized by spinal caries, presents a picture so close to chronic osseous tuberculosis that it was, for a long time, actually mistaken for that disease itself.

Why is it that man so seldom suffers from glanders? Why do we not all, or those of us at least who are exposed to rodents, contract melioidosis? There is nothing in man so very antipathetic to either glanders or melioidosis. We read of frequent glanders infection, at least in laboratory work. "In the Czernowitz laboratory the disease broke out amongst several members of the staff a few days after the breaking of a centrifuge tube" (Topley and Wilson). Many humans, those in close contact with horses, ostlers, grooms and coachmen, appear to contract the disease when it is prevalent amongst the equines. We imagine that our relative immunity from these closely allied diseases is rather a matter depending upon

want of intimate contact than on any special form of natural protection. Leprosy, another of the mycobacterial diseases characteristic of man, has gradually receded from the north-western parts of Europe, where it was endemic in former days, *with the gradual improvement of housing*. It takes a prolonged contact under the *worst housing conditions* to enable the bacillus to spread from one to another. Tuberculosis is more infective. *Our housing conditions, improved as they are*, are still bad enough to allow frequent infection and frequent disease. Did human beings live in *close enough contact* with horses they might well develop glanders. But there are general immunity factors at work as well ! Why do pigs and cattle show a marked immunity to glanders and mules and asses prove so susceptible ? Why are rabbits the easy victims of bovine tubercle bacilli and yet so relatively resistant to human ? There are still mysteries in plenty for the Immunologist.

Clinical and Other Notes.

TWO BICYCLE METHOD OF CARRYING CASUALTIES.

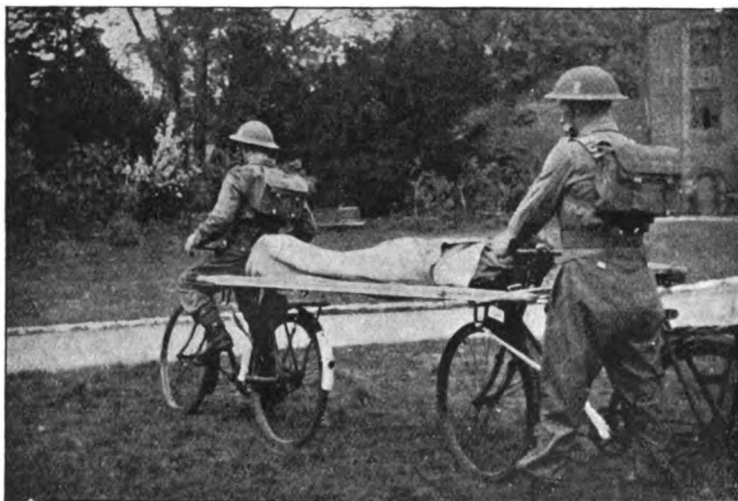
BY MAJOR G. F. PETTY,

Royal Army Medical Corps.

Chief Instructor R.A.M.C. Training Wing, — Training Brigade.

IN the G. 1098 of a Field Ambulance there are eight Carriage Ambulances, Stretcher, Collapsible (Miller James Wheeled Stretchers), on a scale of one per Section and two per Headquarters. The weight of these is 107 pounds each.

In speeding the evacuation of casualties over difficult ground they are invaluable. The R.M.O. feels constantly the need of these and other forms of wheeled transport.



The following is a description of a quickly improvised method which is faster in evacuation than the Miller James and can be used successfully on roads or 12-inch footpaths.

Requirements :—2 Bicycles.

6 Triangular Bandages.

2 Stretcher Slings.

1 Stretcher.

The two bicycles are placed head to tail. An open stretcher is then suspended with the traverse bar close under the saddle and over the rear wheel of the leading bicycle. The stretcher sling is looped to bring the buckle to 1 inch of the sewn edge, then it is looped over one stretcher handle, wound three times round the crossbar of the bicycle and finally looped over the second handle. It may be necessary to slacken the traverse bar slightly to force the last loop. The traverse bar is then straightened and a fair tension is taken on the stretcher sling. The rear end of the stretcher is similarly tied, with the traverse bar against the steering column of the second bicycle. It may be necessary to loosen the nut on the shaft of the front brake and leave it free. If this is not done it may interfere with the steering of the rear bicycle with consequent falls.

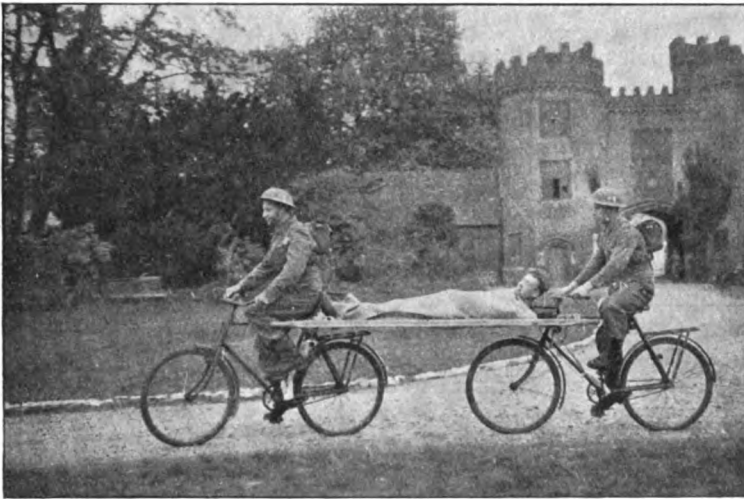
Stays are formed of triangular bandages as follows to prevent the stretcher rocking :—

One end of a triangular bandage is tied to each runner, the other end of the front two bandages then being tied to the left of the bottom bracket near the mudguard of the front bicycle—the other end of the rear two to that of the rear bicycle. In order to keep the bandages clear of the pedals an encircling bandage is tied tightly to each pair, front and back, halfway down, and is itself then tied off to the rear of the frames, front and rear, respectively. This also gives a final tightening to the stays which fix the stretcher. If necessary after the patient is on the stretcher the bandages should be further tightened.

Drill for Loading and Moving Off.—Two men form the squad ; No. 1 is with the rear bicycle and in charge.

No. 2 is mounted in the saddle with one foot on the pedal ready. No. 1 gives the command " Forward." No. 2 then pedals, No. 1 running by the side of his bicycle. When the machines are under way No. 1 mounts himself.

No. 1 gives the order " Slow down to halt." As the machines slow down No. 1 dismounts running by the bicycle and gives the order " Halt." All orders for turning, etc., must be given by No. 1.



ADVANTAGES OF THIS METHOD.

The casualty gets a comfortable journey, the stretcher slings giving additional springing.

A small amount of practice only is required to make the bearers proficient. Casualties can be carried fast over roads and paths. Where the bearers cannot ride the bicycles can be pushed.

G. 1098 equipment only has been used. It is very obvious that special straps could be made instead of using triangular bandages but, in this Training Wing, nothing outside G. 1098 equipment is used in improvisations.

It is lighter than the Miller James and could serve as an additional method of evacuation for R.M.O.s from Companies to the R.A.P.

This method has been successfully put into practice over a period of six months training for S.B.O. Cadets, Medical Officers and Senior N.C.O.s, R.A.M.C., on courses.

FIELD TRAINING—RIVER CROSSING.

BY LIEUTENANT-COLONEL A. LOW,
Royal Army Medical Corps.

THE objection put forward to many forms of Field Training at present being practised by Field Ambulances is that ropes and other materials used are not G. 1098 equipment and would not be available in action. This objection of course does not carry any weight because a unit called on to evacuate casualties up a cliff or across a river must have rope and must obtain it through R.E. sources when the task is set.

The following improvisation, however, does answer the criticism to the extent that G. 1098 equipment only is used and, though the length of material limits the crossing to one of a small river only, it may be found useful to demonstrate the principles to be followed when better equipment is available.

Materials required.

Two 120 feet lengths wire, galvanized.

Four Stretchers.

Two Sandbags.

Two 18 inch poles of hard wood.

The sketch shows the method and a short description only is required in explanation.

The wire is carried across the river, suspended between erected stretchers and tightened by use of Spanish Windlass. The method of securing the end of the wire in the absence of trees or other suitable fixed objects is to tie the wire round a filled sandbag or strong stake buried in the ground to a depth of about 2 feet.

The stretchers are used double to ensure security, opened at the lower end and closed at the top. The lower handles are embedded for stability and to prevent slackening of the wire when weight is taken.

The actual method of carrying the stretcher across has been previously described and is shown in the sketch.

One length of wire alone is sufficient to bear a patient but two are used for safety.

NOTES ON INFECTIVE HEPATITIS IN MALTA, 1938-1942.

BY COLONEL H. B. F. DIXON, M.C.

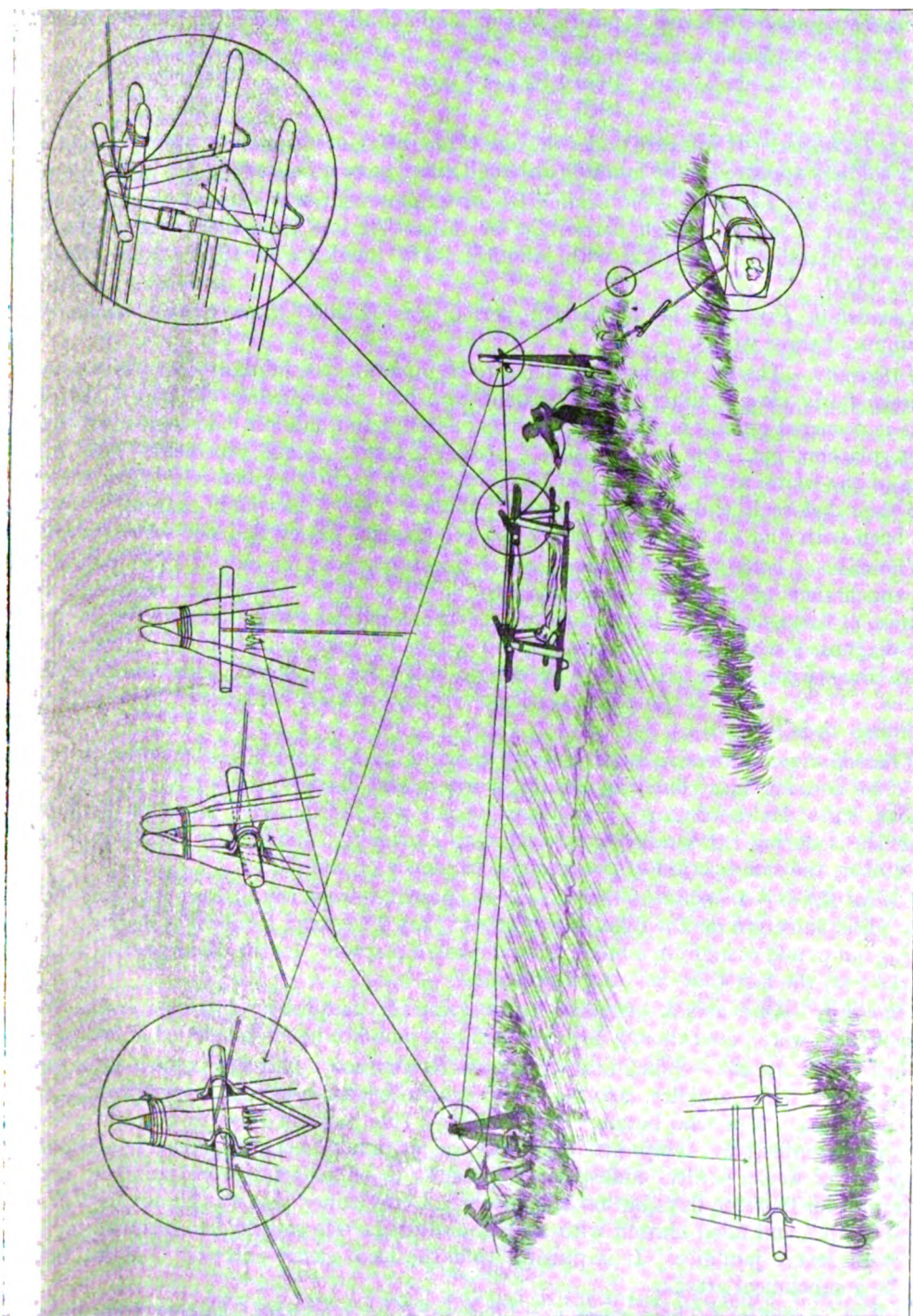
EVER since jaundice became notifiable in the Army, i.e., in 1932, small outbreaks have been recorded in Malta, invariably in the autumn and winter. As the garrison increased the number involved grew larger. New troops on the island were most liable to attack. The outbreaks occurred in different parts each year until the garrison reached its final strength when the disease appeared universally all over the island. As all non-immunes became infected and no fresh troops arrived the number of cases grew less in the last year of the siege.

ÆTIOLOGY.

Seasonal Incidence.—The incidence was greatest from August to February with the peak in November, the epidemic dying out in the spring. A definite parallelism with gastro-intestinal infections was noted, the epidemic of jaundice commencing a month later.

Race Incidence.—The disease was practically confined to British troops, the incidence among Maltese troops being negligible.

British troops	1938	1.14	per 1,000.	Maltese	nil.
"	"	1939	13.87	"	"
"	"	1940	11.53	"	"
					0.24 per 1,000.
					0.71 " "



The figures for later years are not available but the ratio was the same. No epidemic of jaundice was noted at any time among the Maltese civilians.

Sex Incidence.—Infective hepatitis was uncommon among women in Service families.

British women 1938 nil.	Maltese women 1938 nil.
„ „ 1939 1·92 per 1,000.	„ „ 1939 „
„ „ 1940 3·98 „ „	„ „ 1940 „

Age Incidence.—It was rare under the age of ten, being most common among young adults. Older soldiers appeared to be immune although many gave no history of having had jaundice.

Occupational Incidence.—No occupation or employment was exempt though cooks and officers gave a specially high percentage of cases. At one time there were eight officers from one battalion in hospital with jaundice. The incidence in 1940 among officers was 40 per 1,000.

Incubation Period.—The incubation period was usually three to six weeks with a minimum of three weeks.

Infectivity.—The disease was considered to be infectious as, in many cases, it was possible to trace fairly close contact with a patient who had subsequently developed the disease. Thus it occurred among husbands and wives, parents and children and men from the same billet, platoon, etc. On one occasion a stretcher-bearer course was held. Men from all parts of the island attended who had no contact with each other before or after the course. Two days before it ended one developed jaundice. Six weeks later four other men who had been with him on the course developed the disease. They had not seen him since.

Duration of Infectivity.—The duration of infectivity was for only a short period before the appearance of jaundice—probably two or three days. This was suggested by the absence of cross-infection in medical wards where patients were admitted once jaundice was diagnosed whereas there were several cases of cross-infection in surgical wards where they were admitted in the pre-icteric stage for supposed acute abdominal conditions. These cases of jaundice occurred among nurses, orderlies, and patients in adjoining beds.

Transmission.—Infective hepatitis was thought to be transmitted by droplet infection and close contact, most likely by healthy carriers and carriers in abortive and subclinical attacks, e.g. “Malta tummy.” No insect vector was incriminated although in Malta the incidence is during the sandfly season, May to November, and the fly season is from May to October, the same period as the seasonal incidence of jaundice.

Causal Agent.—In spite of there being no positive proof the disease was considered to be a virus infection for the following reasons: (a) The long incubation period; (b) the picking out of odd cases from a billet, a beach post, a platoon; (c) the occurrence of subclinical attacks; (d) the fact that one attack protected.

Immunity.—One attack appeared to protect. In families and troops living in close contact cases were noted though any who had had jaundice never developed a second attack.

Subclinical Attacks.—Subclinical attacks were common. Out of six men in a post one might report with jaundice, another with indefinite gastro-intestinal symptoms, another with diarrhoea. Men who became jaundiced as a rule had not been in hospital previously with gastro-intestinal symptoms. Attacks of jaundice were frequently preceded by tonsillitis six weeks earlier. One patient, thought to be suffering from jaundice, was kept in hospital for fourteen days but no bile appeared in his urine. He was let out for Christmas, “beat it up,” and filled himself with alcohol and food. He returned to hospital on Boxing Day with severe jaundice. It is possible that the local gastro-enteritis, “Malta tummy,” may be a subclinical attack.

N.A.B. Jaundice.—There were very few cases of jaundice following treatment with N.A.B. but there were very few syphilitics on the island. In the few cases which occurred there was no clinical difference between them and the ordinary case.

CLINICAL PICTURE.

There were two types, afebrile and febrile.

(1) The afebrile type was symptomless except that the patient may have felt a "bit off colour" or "livery" for a few days with slight loss of appetite. He had not gone sick and would not have reported had not he noticed his urine was very dark or someone had told him he had the "yellow jaundice." There was no fever, pain or abdominal symptoms. The liver might be enlarged.

(2) The febrile type closely resembled sandfly fever. There was even the pain in and behind the eyes. Some cases started with nasopharyngeal catarrh; in a few bronchitis was the first symptom; in some the symptoms suggested enteric fever. Patients sometimes were discharged from hospital after what was thought to be sandfly fever and returned the next day with jaundice. Pain occurred in the abdomen, sometimes in the centre of the epigastrium, sometimes in the right iliac fossa, though more commonly in the right sub-costal region. Cases have frequently been admitted to surgical wards as appendicitis or *Bact. coli* pyelitis. Liver and splenic enlargement were not marked in Malta. Usually on the fourth or fifth day a patient, who had been running a temperature of 99.2° , perhaps up to 102° F., found that jaundice had appeared and that he felt definitely better. The pyrexia then ceased and the jaundice gradually increased in intensity, reaching its maximum about the twelfth to fourteenth day from the onset of the illness, then gradually decreasing. The urine generally became free of bile on about the twenty-first day. The jaundice disappeared shortly after, being usually clear on the twenty-eighth, but in some cases it remained much longer, even as long as seventy-two days. The febrile type was most common in officers.

An appreciable number of cases of infective hepatitis ran a much longer course with gross enlargement of the liver, persistent jaundice and very slow recovery.

Bile could usually be detected in the urine one or two days before the jaundice appeared. Bradycardia was marked as soon as jaundice appeared. Pruritus was rare. There was much depression until the jaundice had disappeared. There were no cases of hæmorrhage even in the severe attacks.

The disappearance of bile was not considered to be a sufficient criterion of cure for in many cases the liver was found to be enlarged after the urine was bile-free. To get these patients out and about on ordinary diet too soon was to invite a relapse. The various chemical tests were not of great value, clinical judgment alone being the safest criterion of recovery. When all biliuria and icterus had disappeared, when the liver and spleen were normal in size, and the patient free from symptoms and gaining weight, then only was he considered fit for discharge. Moreover he had to go slow for at least a fortnight and avoid alcohol for at least three months. On the whole cases were much less severe than those seen in the United Kingdom.

Recurrences.—Recurrences occurred in less than 3 per cent of cases in Malta. They were usually worse than the primary attacks and generally the result of dietetic or alcoholic indiscretions.

Mortality.—The mortality was negligible—less than 2 per 1,000 in Malta. Several patients were very ill but all recovered.

PATHOLOGY.

Laboratory Investigations.—All laboratory investigations were negative or inconclusive. A certain proportion showed definite evidence of secondary anæmia. Reduced Hb. and R.B.C.s with C.I. less than one. W.B.C. slightly subnormal with relative lymphocytosis, never leucocytosis with polymorphonuclear increase.

DIAGNOSIS.

Early diagnosis was possible by observing bile in the urine, frequently forty-eight hours before jaundice appeared. All men reporting sick with any gastric symptoms during an epidemic of jaundice should have their urine examined.

PROGNOSIS.

The prognosis was good. No complications or after-effects were noted provided the patient kept off alcohol.

TREATMENT.

Patients were treated on a fat-free diet with high carbohydrate and high protein content and kept in bed until the urine was free from bile. Otherwise treatment was symptomatic. The stay in bed was usually twenty-one to twenty-eight days, but in severe cases up to three months.

OFFICE OF FOREIGN RELIEF AND REHABILITATION OPERATIONS.

THE Office of Foreign Relief and Rehabilitation Operations has reported on activities of medical personnel attached to its North African Mission and outlined the nature of its preparations for health and medical measures in future relief theatres.

O.F.R.R.O. medical personnel have had a variety of duties. A principal task since arrival of the O.F.R.R.O. mission early in 1943 has been technical assistance to French authorities in estimating and adjusting to available supply requests upon Lend-Lease for drugs, medicines and other medical supplies.

Development of the North African campaign made health and medical problems less complicated than had been anticipated. It had been feared that the severe bombardment of Axis forces in Tunis might create a serious health problem through destruction or damage to the water supply and sewage disposal systems of the city. Yet, so precisely had Allied bombers concentrated on the harbour area that only minor damage of this type occurred in the city and fears that typhoid and dysentery might become serious in Tunis and spread to other areas were promptly dissipated by rapid repairs effected by military engineers. Likewise, typhus, the louse-borne disease which readily assumes epidemic form in the uncleanness of battle conditions, had been feared because it was known that only the year before (1942) there had been close to 25,000 active cases in the region. Yet, in 1943, only a few scattered cases were reported in all of Tunisia. It was assumed there would be some damage to hospital facilities but in Tunis the hospitals were found intact with 1,000 empty beds. Although some of the other Tunisian cities, such as Bizerta and Sousse, had received rougher treatment, the public health officers reported in general after the campaign that health conditions throughout the area were normal in virtually every respect. Captured atabrine was on hand for the malaria cases and sulfa drugs were made available from military stores to make good the two most serious deficiencies in medical supplies. First-aid stations for air-raid casualties were found to be adequate.

Because of its bearing in the future on health problems created by airplane traffic, a programme of great interest initiated by the health officers in North Africa is the de-insectization of airplanes entering the region from outside points. Several potentially dangerous diseases, now more or less localized, can be carried from one portion of the world to another by insects in airplanes. The problem is being met in North Africa where, with O.F.R.R.O. assistance, considerable progress has been made in developing techniques to neutralize the danger that disease might be spread by such means.

To meet varying conditions in prospective relief theatres, several different types of "packaged" units of medical supplies are being assembled under the direction of Dr. Crabtree for immediate shipment to any area of need. One is a basic Emergency Unit comprised of the minimal medical supplies required for the control of the more common diseases of world-wide occurrence. This unit is designed to care for the needs of a population group of 100,000 people for a period of one month and includes some 150 items considered by expert authority to represent an irreducible minimum for basic medical needs. Multiples of this unit can be immediately shipped into any area of medical relief activities during initial stages of operations. Secondly, plans are being made for a larger Standard Unit of supplies made up of the

various drugs, medicines and surgical and sanitary equipment which will be required by a population group of 1,000,000 people over a three months' period.

Minimum "precautionary reserves" of hospital and laboratory equipment are being "packaged" and kept ready in storage for immediate shipment in accordance with needs developing after military action. In this field of supply two standard hospital units have been prepared, one comprising the essential equipment (exclusive of buildings) for a 50-bed hospital and the other similar equipment for a larger, 150-bed hospital. The "packaged" laboratory materials include equipment for epidemic control laboratories, emergency field laboratories, the minimal laboratory requirements of a 50-bed or 150-bed hospital, a central pathological laboratory and a laboratory supply centre. There are supplemental laboratory units, also, so that any one of the basic laboratory "packages" can be readily expanded to correspond with disease conditions encountered or the extent of need in terms of population.

O.F.R.R.O.'s health officials are proceeding slowly in recruiting American personnel for service abroad. A limited number of health officer "teams" are being brought together under O.F.R.R.O. auspices, however, for service in areas which may be opened for relief activities in the near future. An O.F.R.R.O. public health team is made up of a principal medical officer, a sanitary engineer, a pediatrician, a medical nutritionist, a medical supply officer, a nursing specialist, and, for certain areas depending upon need, a malariologist and a hospital administrator.

Reviews.

NARCO-ANALYSIS. By J. Stephen Horsley. Oxford University Press. 1943. London : Humphrey Milford. Pp. vii + 134. Price 8s. 6d.

This book describes a technique devised by the author in order to shorten the course of psychotherapy. It deals with the use of drugs in dealing with inaccessible patients, in breaking down inhibitions during the course of psychotherapy, and in promoting abreaction in patients whose neurosis arises from a psychological trauma. The treatment of War Neuroses is described.

There is much of interest and value to psychiatrists working in forward areas of active theatres of operations and indeed to all medical officers who have to handle acute Battle Neuroses.

PSYCHOPATHOLOGY. A SURVEY OF MODERN APPROACHES. Third Edition. By J. Ernest Nicole, L.M.S.S.A., D.P., M.R.C.P. & S. London : Baillière, Tindall & Cox. 1942. Pp. xi + 265. Price 15s.

The third edition of this book is as welcome as its predecessors and will be of particular interest to all who wish to study the development of modern approaches to the complex problems of Psychiatry in its wider aspects.

Commencing with a historical introduction the author presents objectively the current views and conceptions of the different schools of Psychopathology. Criticisms are withheld except where these are necessary for a fuller appreciation of the similarity and differences between the various approaches. Additions have been made to most chapters and new material has been incorporated.

The Chapters on applied Psychopathology will stimulate an interest in further reading for which the extensive bibliography specially indexed will be most gratifying.

Notices.

BRITISH ASSOCIATION OF OTOLARYNGOLOGISTS.

An Association known as the British Association of Otolaryngologists has been formed. The officers are as follows :—

President : W. M. Mollison.

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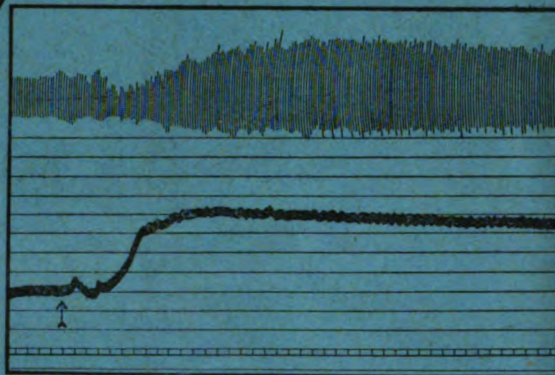
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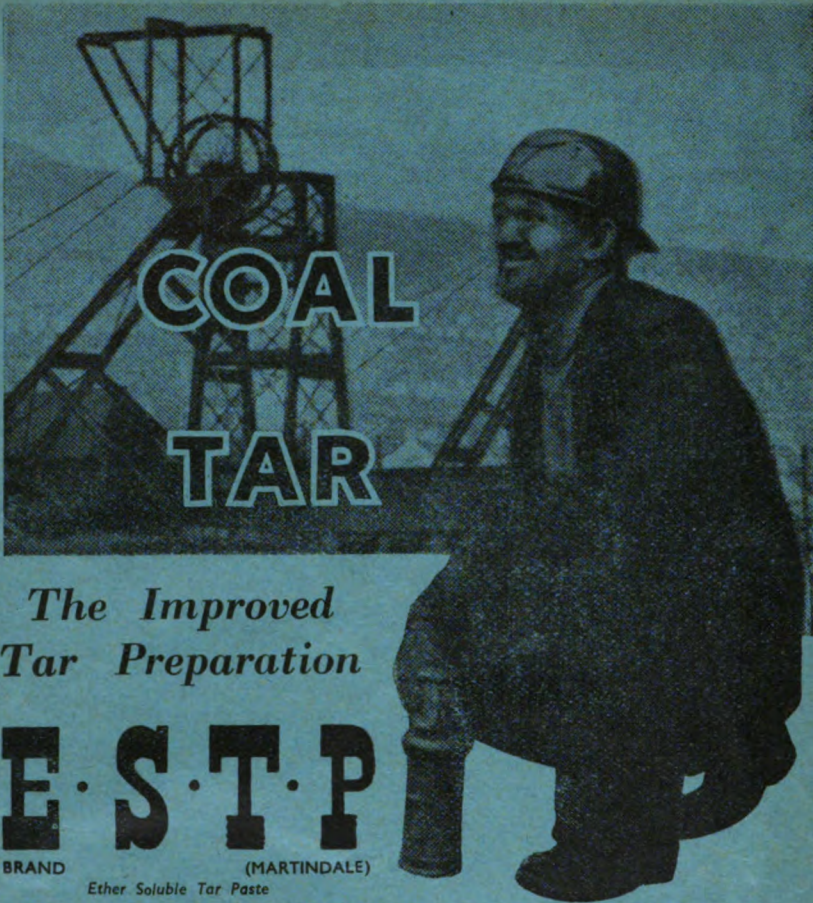
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A HYGIENE VISIT TO THE ANCIENT WORLD.

BY MAJOR MORRIS MARKOWE,

Royal Army Medical Corps,

AND

MAJOR A. W. S. THOMPSON,

Royal Army Medical Corps.

SILENT as Cortes on his peak in Darien, two hard-boiled hygienists stood entranced under the midday sun of August in North Africa. The object of our admiration was a constant-flush trough latrine of a type not unlike the R.E. model recently authorized for permanent camps. This one was somewhat more elaborate and certainly more permanent being at least fifteen hundred years old.

We stood there in awe, in admiration, in delight. Here, we felt, was the work of a man who was artist as well as sanitarian. In symmetry, balance, simplicity and practical qualities, in its perfect combination of beauty and utility, the thing was superb. Fifteen hundred years of weather and decay had left no mark; it might have been erected yesterday. There it stood, a monument for all time to one of our own craft, triumphant over time and change; and all around lay the ruins of a vast city and, beyond them, miles and miles of arid wilderness.

There was only one gesture that could adequately express our homage and that gesture was made. We could have sat there all day.

The ruined cities of North Africa have been studied in detail by archæologists but the ordinary medical reader knows little or nothing about them. The water closets of Timgad are featured in several histories of medicine but are not described in detail. The present writers have had the good fortune to find themselves within a few days in two of the most remarkable Roman cities in North Africa and it occurred to us that a description of these visits, in the spirit of a military hygiene report, might be of interest to other hygienists. Our observations have of necessity been somewhat hurried and superficial and we cannot pretend that the descriptions given below are any more accurate in detail than the usual hygiene report on a military camp. We have aimed merely at a general picture of the

sanitation of these cities sufficiently comprehensive to permit a fair comparison with a modern town of similar size.

Timgad was founded about A.D. 100 under Trajan at the time when the Roman Empire had reached its maximum extent. It flourished for about six hundred years. To-day it lies deserted in the midst of a lonely waste over thirty miles from the nearest modern town of any size. No present day route passes through it and, were it not for its archæological interest, its site would now be quite unknown.

It was a Roman frontier city; more than a hundred miles of difficult mountainous country separate it from the sea and, to the south, between it and the Sahara, are the wild Aures Mountains, the highest in Algeria, lonely defiles and craggy ridges rising to over seven thousand feet. You come on it suddenly, a vast, silent, ruined city, covering a slope in the midst of rolling country intersected by water courses which in summer are completely dry and in winter become extensive malarial swamps. Very little of what remains stands more than a few feet above the ground but the fascination of it lies in the fact that there we have the bones of a city laid out when the Roman civilization was at its height; a city planned to the last detail and a city which since its fall has never been built over. As you stand in the midst of it, it is as if the original drawings of the architects of Trajan were laid out for your inspection.

Djemila on the other hand though, in virtue of setting and the state of preservation of its surviving buildings incomparably more beautiful, shows a mixture of architectural styles ranging over four or five centuries. It, too, lies many miles from any modern highway, covering a lofty promontory in a valley between mountains which, in the evening light as we drove away, looked as sterile as the mountains of the moon. At the present day it is entered only from the south, the other three sides being so steep that it is difficult to understand how, in the days of its glory, main roads radiated to the four points of the compass from the very centre of the town. Its ancient name was *Cuculum* and, at its height, it was a city of about ten thousand inhabitants.

These ruins are veritable monuments to Roman sanitary achievement. There are no signs of anything like slums. Everything that remains speaks of solid planning and construction; cities built to last for ever. That they now lie ruined and deserted is no fault of the men who drew up their plans or the architects who carried them out.

In the description which follows we have, in general, dealt with them together drawing attention, however, to certain interesting points of difference.

A.—WATER SUPPLY.

(i) *Sources*.—The source in both cases appeared to be from remote mountain springs or rivulets. The water was led down the mountain sides in open rectangular aqueducts constructed of stone blocks closely fitted together. The nature of the source probably guaranteed a pure supply but, in these open conduits, a certain amount of natural purification by mechanical agitation, by fish and plant life and by exposure to the sun probably took place.¹

(ii) *Storage and Service Reservoirs*.—At Djemila there is a battery of cisterns where the aqueduct entered the city, situated partially underground alongside one of the main squares. The receptacles consist of large rectangular stone chambers, smooth faced with plaster or cement and connected in series by inter-communicating stone chambers at the bottom; the bottoms are rounded, presumably to facilitate cleansing.

(iii) *Distributing Mains*.—These consisted of miniature covered aqueducts supported

¹At Lambese, about twelve miles from Timgad, there was discovered in 1866 a memorial column which records how a consultant engineer was called to Bougie when work on the water tunnel which was being driven through a nearby mountain appeared to have gone wrong. Tablets on the column relate how the consultant, after being attacked and robbed by brigands, finally arrived at Bougie and solved the problem for the local engineers. This tunnel, 1,820 feet long, still carries the main water supply to Bougie. This event occurred about A.D. 150 so it is not unlikely that the same engineer may have been concerned with the water supply of Timgad.

The column mentioned above now stands in front of the Mairie at Bougie.

about three or four feet above street level. The channel was semi-circular in cross-section and was hollowed out of the upper surfaces of a series of long rectangular blocks of stone, placed end to end and supported on piers. It was closed by means of flat rectangular slabs placed end to end in order to prevent surface pollution; this object was also assisted by raising the mains above street level, thus minimising the opportunities of entry of surface water and dust.

(iv) *House Cisterns*.—These were found in considerable numbers in the living rooms of private houses, mostly at Djemila, fewer at Timgad. They consisted of large stone urns, cylindrical or hexagonal in shape, having a capacity of about eight or ten gallons. They were, incidentally, very similar to the baptismal fonts to be seen in old English churches. No signs of taps were found and this must have necessitated the use of dipping utensils and therefore a certain amount of surface pollution; but some possessed a circular hole near the bottom, presumably for drainage. One or two urns had on the upper margin a worn area suggesting that they had once been provided with a feed pipe.

(v) *Wells*.—In the public washhouse at Timgad a beautiful specimen of a shallow well was found some five feet in diameter with the steining from below the water level (at least ten feet down) carried up as a coping two feet above ground level. The steining was perfect, the regularly shaped stones requiring no plaster or cement to improve their fit. This well was not covered.

In the Forum at Djemila there is a disused well covered with large flat stones extremely well preserved and effectively preventing surface pollution.

(vi) *Fountains*.—Outside the Museum at Timgad there is on a high pedestal the statue of a small boy. Water is fed up through the statue from a spring under the pedestal and emerges from two apertures—from an urn carried on the left shoulder and from the base of what was at some time a penile organ.

In the Djemila Museum there is a partly draped female figure supporting a large shell in front of the pelvis, with an opening on its base through which water poured. The drapery and the protective shell indicate a measure of artistic decadence but the anatomical perfection of the torso was in the best Greek tradition.

B.—BATHS.

(i) *Public Baths*.—These were in such profusion throughout both cities and showed such uniformity of design that our enthusiasm for their magnificence waned towards the end of our tour. This demonstrates only too forcibly the extreme interest in personal cleanliness displayed by the Romans. There were large baths (Thermæ) in every important district of the city and small ones in almost every street or at every big street junction.

The essence of design of the public bath lay in the combination of a municipal chamber for communal use with small private annexes for the more important members of the community. The former resembled a small swimming bath in size and shape while the latter were semi-circular bays at one or other end of the main chamber. Heating of the water was achieved by means of a double floor, the upper being supported on numerous brick pillars about twelve to eighteen inches in height. Through the spaces thus formed smoke and hot air from an adjoining furnace chamber circulated. In some cases the fumes emerged through chimneys, in others they percolated through hollow walls on three sides of the bath chamber, thus warming the interior and preventing condensation on the walls. The walls and floors were constructed of brick and plaster, usually with a mosaic on the floor. Many of these mosaics on the floor have been erected as murals in the Museum at Djemila. All are late Roman and bad decorative art, mostly consisting of crude geometrical figures; some show evidence of Byzantine influences. It was interesting to note the appearance of the swastika, which was in those days a Christian symbol, in many of the mosaics at Djemila.

(ii) *Private Baths*.—These were found in a large number of dwelling-houses and were similar in design to the public ones although we noted several examples of cold plunge baths

with no evidence of heating apparatus. Double floors of the type mentioned above were noted in several rooms of certain private houses, suggesting the existence of a central heating system.

C.—WASH-HOUSES.

At Timgad we inspected a large public wash-house near the Decumanus Maximus. It consisted of a large chamber, some twenty by thirty feet, the open shallow well described above being situated in one corner. The remainder of the chamber consisted of a number of bays containing large stone vats, some rectangular and some circular in shape, and some possessing heating arrangements similar to those described above in connexion with the baths.

D.—LATRINES.

These show interesting evidence of the method of evolution of the Roman water-closet. We found three main types, each consisting of a rectangular enclosure, round the walls

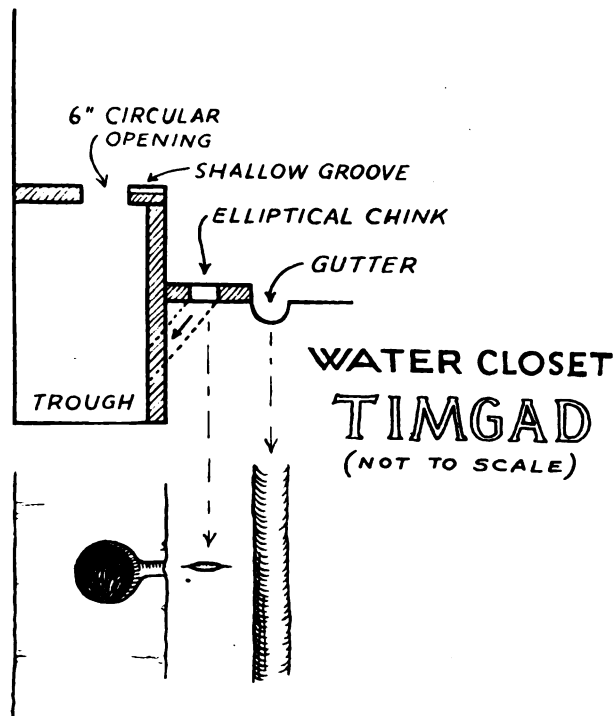


FIG. I.

of which ran a sitting platform of stone slabs placed over a deep water channel, rectangular in section, and apparently flushed by a constant stream of water. In our view the closets at Timgad were slightly more primitive but less frankly utilitarian than those at Djemila. The former were highly ornamental, consisting of one- and two-seater slabs, flanked on either side by extremely artistic stone balustrades in the form of dolphins. The dolphin motive also appears at Djemila but here all the latrines appeared to be communal, there being no single or double divisions.

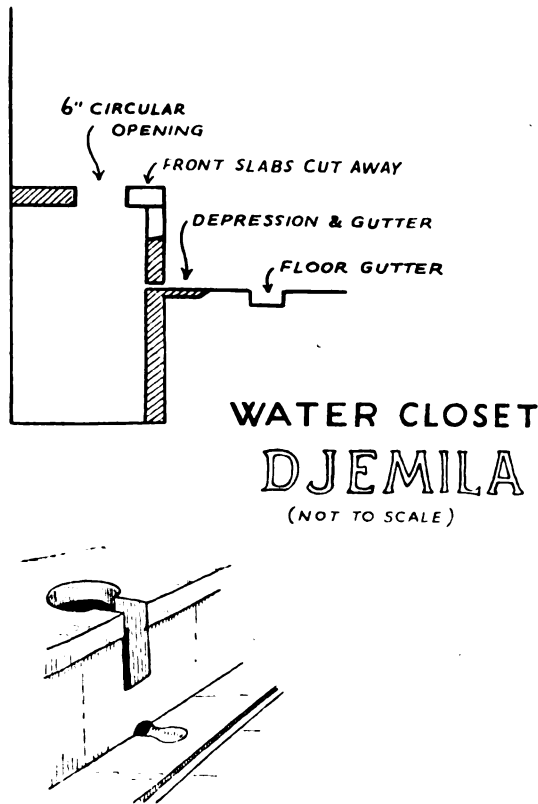
The Numidian sanitarian does not appear to have realized that an opening as large as that which is usual to-day is a practical proposition. He employed a circular aperture six inches in diameter and overcame the obvious disadvantages of such an arrangement in two ways. At Timgad we found the primitive first stage, merely a shallow groove in which the male genitalia rested, the urine trickling on to the stone floor between the feet and passing

through an elliptical chink leading directly into the water channel below. At Djemila there is evidence of the second and third stages :—

(a) The genital groove has now become a deep cut through the thickness of the slab and the upper third of the front wall of the superstructure, rather like a very exaggerated edition of our modern horse-shoe latrine seat. The fact that even this device was an inadequate modification of the primitive model is shown by the presence of a tiny chink at floor level, in the front wall, through which again the odd dribble of urine might reach the main channel.

(b) The latest refinement which we noticed was a shallow plate-like depression on the floor slab, directly in front of the last-mentioned chink and connected with it by a shallow gutter.

Surface drainage of the whole chamber was provided in all cases by a rectangular gutter



about two inches deep by four inches wide, running parallel to and about eighteen inches in front of the seats, drained at one corner into the main drainage channel.

Urinals.—The only one which we saw was in the public latrine at Timgad and was identical in design with the shallow trench urinal of the Army Manual of Hygiene and Sanitation except that this specimen consisted essentially of a shallow rectangular stone trough draining through a small aperture into the main drain.

E.—DRAINAGE.

(i) *Street and Surface Drainage.*—At Djemila there are numerous specimens of square stone ware gratings consisting of a flat stone slab with a central circular depression pierced

by elliptical or circular openings. The streets at Timgad showed evidence of shallow open gutter drains on either side along the front walls of the houses.

(ii) *House Drains and Sewers*.—Timgad abounded in long rectangular stone blocks pierced from end to end with a three to four inch boring; these were probably either constituents of house drains or of rain water pipes. Down the centre of almost every street in Djemila there ran the main sewer, rectangular in section—about eighteen inches wide by three to four feet deep—and constructed of carefully fitted stone slabs. We could find no evidence of sewage disposal works nor, indeed, would this appear to have been necessary as an adequate and pure water supply was brought from a great distance and was effectually protected.

F.—BROTHELS.

In the immediate neighbourhood of many public buildings at Djemila one sees wall stones bearing phallic emblems indicating the direction of the nearest brothel. The blatency of these crude direction signs is highly significant. One of the smaller urns we observed had apparently been part of the furniture of a brothel as it bore a crude though conventionalized representation of coitus. It was interesting to note that the standard of execution of this design was of a particularly low order.

In the Museum at Timgad, discreetly veiled from the public eye, is a lewd and somewhat revolting mosaic which probably adorned the floor of a brothel.

DISCUSSION.

How many modern towns of 10,000 inhabitants have public services comparable to those of Djemila or Timgad? As you walk through these ruins one idea forces itself upon you: there was nothing primitive about the minds of the men who built these cities. Their engineering was a finished science, their planning sure and grounded in experience, their outlook thoroughly sophisticated and in every sense urbane. Life in these cities must have been as far removed from arcadian simplicity as is life in the West End of London to-day.

Timgad, the planned city *par excellence*, is laid out in squares like the streets and avenues of New York. It is unnecessary to relate this to the design of the Roman camp since planned cities as widely separated in time and space as Chicago and Samarra were laid out in the same way. It is an idea so obvious that it will always present itself to the mind of the town planner, of whatever age or culture, and in itself it merely implies planning, a fairly high level of civilization and, often, a virgin site.

The water-closet, also, is based upon a very obvious idea. The germ of it is already present in the mind of the savage who defæcates into a stream as a convenient way of disposing of his excrement. The sanitarian of any people beginning to congregate in towns and cities will sooner or later turn over in his mind the possibility of automatic disposal of excreta on the water-borne system.

The modern hygienist who reads about Roman water-closets is liable to regard them as freak developments and to imagine that they must have been rare in the Roman world. This was obviously not the case. We saw four separate sets of public latrines in Djemila, one of which had thirty seats; this in a remote frontier city whose chief inhabitants were military veterans.

The Roman water-closet was not in any sense the ancestor of ours. It was quite an independent development. Similarly, in the Palace of Minos on Crete, which was finally destroyed about fifteen hundred years before Timgad was built, there were water-closets and sewers which were in some respects superior to those of the Romans and possibly even to ours. But the Romans had no knowledge of their existence. There is nothing remarkable in the idea of a water-closet but the fact that the idea has been applied in practice, and on a large scale, denotes a very high level of culture indeed.

Hygiene, in ancient Rome as in the modern Army, was mainly common sense. What we admire in Timgad and Djemila is not so much the cleverness or originality of the Romans

as the vision and sureness with which they based the design of their cities upon the principles of sanitation. We, to-day, who too often give lip-service to hygiene and forget about it in practice, may well look to them for a model. Has sanitation really made much advance in fifteen hundred years? On the technical side certainly; but, in the application of available knowledge to everyday life, can we be so sure? The average rural dwelling in the English Midlands has neither a water-closet nor a bath and depends for its water supply on a stand-pipe or a shallow well; the Roman veteran of the wars, living in a city on the edge of nowhere, surrounded by rugged mountains infested with wild animals and brigands, had a piped supply of pure water to a storage cistern in his kitchen, a palatial heated bath-house at the corner of the street, a public latrine in the next block and a municipal wash-house a few streets away, not to mention many other amenities outside the scope of the present article.

It seems to us that we have a long way to go before we can be said to have made as much use of our hygienic knowledge and resources as the builders of Timgad and Djemila.

NOTE.—Owing to active service conditions and lack of library facilities we were unable to consult standard works and so found it impossible to check details and had to rely solely on our own observations and deductions.

AN OUTBREAK OF SMALLPOX IN BRITISH TROOPS
WITH A NOTE ON
THE USE OF SULPHATHIAZOLE IN TREATMENT.

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DURING the period November, 1942, to April, 1943, there was an epidemic of smallpox among the civil population of this area. The British troops in the neighbourhood were soon affected and altogether 68 cases of smallpox have been admitted to this base hospital. Twenty-two were major cases, the remainder minor smallpox modified by vaccination. The vaccination state of the major cases is shown in Table I and reveals the lamentable fact that half of these patients had never been successfully vaccinated. Ten patients died, four in the toxic stage and six in the focal pustular stage of the disease.

TABLE I.—MAJOR CASES.

<i>Last successful vaccination</i>	<i>Number</i>	<i>Deaths</i>
Nil	11	8
Infancy	9	2
Within 5 years	1	0
Within 2 years	1	0
Total ..	22	10

The incidence of the disease did not fall particularly on any one unit but every unit in the area contributed patients. They were almost invariably admitted to hospital in the pre-eruptive stage as cases of undiagnosed fever and it proved impossible to distinguish the smallpox cases from the large number of other patients with simple fevers and malaria passing daily through the reception room. It became necessary therefore to operate an "observation ward" to which every patient with fever was first admitted. In this ward barrier nursing precautions were observed and patients were isolated for a minimal period of three days or until such time as the possibility of smallpox could be ruled out. In addition a rule was made that every patient whatever his complaint would be vaccinated on admission unless he had evidence of successful vaccination within the last twelve months. These measures undoubtedly checked what might well have been a serious outbreak of smallpox among the 1,500 patients in the hospital. However, universal vaccination during an epidemic is not without its risks. At least four of our patients had an aggravated form of the disease from being vaccinated while already incubating smallpox; two of these died, and it is worth noting that in one of these cases *eleven days* elapsed between vaccination and the appearance of typical smallpox rash. Vaccination at this early stage of incubation is usually said to be protective and yet this patient developed a hemorrhagic form of the disease.

Clinical Features.—The majority of the cases being modified by previous vaccination showed few points of particular interest. To a variable extent all the classical signs of the disease were seen. Headache and backache were common presenting symptoms and initial high fever was the rule. The highest temperature noted was 106° F. and very seldom was it below 102° F. It was noticeable that certain features of the rash usually considered to be of value in diagnosing smallpox were frequently absent in the first three or four days of the disease. Thus the rash would often appear on the trunk alone or at least be far more extensive in its central rather than its peripheral distribution. Again the characteristic

description of the individual lesions as being all at the same stage of maturation did not hold good until at least four days had elapsed. Before this it was common to see macules, papules and vesicles all in one small area. These points might have confused the diagnosis especially as during the smallpox epidemic there was simultaneously a much smaller outbreak of chickenpox.

The most consistently useful diagnostic sign was the finding of even a single vesicle which showed *umbilication*.

Prodromal rashes were seen in only five cases. Four of these were the classical maculopetechial rashes of "bathing drawers" distribution. They occurred in infancy-protected soldiers and the subsequent course of their disease was mild. The fifth patient who was unvaccinated had a generalized scarlet erythema especially vivid on the palms and soles. He later developed petechiæ and a few typical vesicles but died on the fourth day from what was almost certainly intra-abdominal hæmorrhage.

The Fatal Cases.—Eight of the patients who died were unvaccinated, the remaining two had had successful vaccination in infancy. Two of the cases were frankly hæmorrhagic; the first of these in addition to skin hæmorrhages had bleeding from the mucous membranes of nose, mouth and bladder. Bleeding time was ten minutes and his blood was entirely devoid of platelets. The second case mentioned above died on the fourth day with clinical symptoms suggesting hæmorrhage into the pancreas or mesentery but no post-mortem examination was made.

Four other cases while not showing a generalized hæmorrhagic state had numerous hæmorrhages into vesicles. The remaining four cases died in the secondary toxic stage with confluent pustular eruptions.

Complications.—In the surviving cases complications were uncommon. Acute orchitis of a few days duration was seen in one case. Hæmorrhagic nephritis starting on the fourth day occurred in one patient but after six weeks his recovery was apparently complete. Peripheral neuritis involving the right deltoid with a transitory weakness of the right quadriceps muscles developed in one patient while convalescent (a week after scabbing). The disability in the shoulder muscles remains considerable and the condition is only very slowly improving. Skin suppuration (cellulitis and boils) delayed convalescence in two cases. Iritis occurred in two cases at a stage when convalescence appeared to be well established.

Treatment.—The local measures adopted were those usually recommended; spraying or painting the skin with 5 per cent potassium permanganate or dilute phenol (1 : 40), mouth washes and inhalations, and argyrol and atropine drops for the eyes when the conjunctivæ were involved. Warm permanganate baths were given as soon as the patient's condition permitted it.

Drugs.—Xylol: This drug given by mouth has from time to time been enthusiastically recommended. It is claimed that it is effective in all cases of smallpox except hæmorrhagic forms or the severest confluent type, both reducing the toxicity and modifying the eruption. Its mode of action is however unknown. Haughton (1939) recommends doses of thirty minims in milk to be given four times daily for the first three days, three times daily for the second three days and twice daily for the third period of three days.

Xylol was initially given in this manner to all our cases. No dramatic results were observed. In an occasional case it was thought that pustulation was less than had been anticipated but it was clear that in the large majority the severity of the disease and the development of the skin lesions depended upon the previous protection of the individual rather than upon the treatment.

Sulphonamides: Since the introduction of the sulphonamide group of drugs sulphanilamide and sulphapyridine have been quite extensively used in the treatment of smallpox and very optimistic reports have been given of their effectiveness. The need for caution however in assessing the value of any form of treatment in the case of patients who have ever been vaccinated has been emphasised by Wilkinson (1942). His paper deals with an outbreak

of smallpox in Hongkong in which he had an opportunity of treating a large number of totally unprotected patients. He used sulphanilamide and concluded that this drug was of value in that, though without effect upon the toxic stage, it would in certain cases modify the skin lesions and was undoubtedly helpful in combating complicating septic conditions.

In our series sulphapyridine was given to ten successive major cases of smallpox in an average total dosage of 30 grammes, the treatment being started about the fourth or fifth day when vesiculation was fully established. There were four deaths in this group (3 patients unprotected, 1 vaccinated in infancy). In no case did the sulphapyridine appear to have any influence upon the rash, the fever or the general condition of the patient. The course of the disease, degree of pustulation and subsequent scarring appeared again to bear a strict relation to the protection possessed by the individual.

The Secondary Pyogenic Invader.—The failure of this treatment brought into question the identity of the pyogenic organism responsible for the pustulation of the vesicle. Observations upon this point have been difficult to find. Wilkinson (above) says "that in the majority of cases where a bacteriological examination was possible a streptococcus was isolated." Such other references that are available also implicate a streptococcus.

Our own observations did not confirm this; in eighteen patients cultures were made from the contents of vesicles at the commencement of pustulation. In every single case a *staphylococcus aureus* was grown in pure culture. The only occasion on which a streptococcus was found was when a culture was made in the fifth week of the disease from a skin abscess in a patient with severe septic complications. In this case a hæmolytic streptococcus and a *staph. aureus* were grown.

Blood Cultures.—It seemed possible in view of the extreme degree of toxæmia associated with the stage of pustulation in some cases that a bacteraemia might be present. Blood cultures were therefore made in eight severe cases, the blood being taken in some cases before and in some cases after the establishment of pustulation. In no case however was any organism grown.

Sulphathiazole: The constant finding of a staphylococcus as the secondary invader in these cases prompted the suggestion that sulphathiazole should provide a more effective chemotherapy than sulphanilamide or sulphapyridine. It was clear that the effects of treatment could only be interpreted if the patients had little or no previous protection. Unfortunately the decision to make this trial was taken late in the epidemic by which time improved vaccination was bringing the outbreak under control. The number of cases considered suitable for this treatment has therefore been small. The drug was given by mouth for five or six days with a total dosage of from 25 to 30 grammes. A summary of the cases treated is given in Table II. It will be seen that the day on which the treatment was started varied considerably and in the light of later experience it is clear that in several cases it should have been started earlier.

In the first case sulphathiazole was given in an attempt to combat severe and widespread sepsis. This was a very severe confluent case who was given xylol for the first nine days without effect, the temperature continuing to swing between 98° and 104° F. On the tenth day a deep abscess in the left scapular region was incised and in the next few days numerous other cutaneous and muscular abscesses formed. From the seventeenth until the twenty-fourth day he was given a course of sulphapyridine (26 grammes) but this only resulted in a slight depression of the fever. His condition was now very grave. At this point (as already mentioned) culture of pus from an abscess yielded a growth of *Staph. aureus* and a hæmolytic streptococcus. Sulphathiazole was started on the thirty-first day and 24 grammes were given. The effect was dramatic; within forty-eight hours the temperature was normal. The skin abscesses were drying up and the general condition was a hundred per cent improved. The temperature remained normal for ten days after which there was a slight recrudescence with development of a fresh skin abscess but, again, this was controlled by a second course of sulphathiazole and following this there was no more fever. His

TABLE II.—CASES TREATED WITH SULPHATHIAZOLE.

Case	Vaccination	Day of disease sulphathiazole started	Effect on eruption	Temp. controlled	Remarks
1	Nil	31st	Rapid improve- ment in second- ary sepsis abs- cesses, etc.	Within 48 hours	Dangerously ill with mul- tiple abscesses until S.T. given; immediate dra- matic improvement
2	Nil	7th	Nil	Nil	Confluent pustulation; died on 12th day
3	Nil	11th	Nil	5th day	Very severe case recovered; some pitting
4	Infancy	7th	Nil	4th day	Severe case recovered; some pitting
5	*Nil	3rd	No pustulation	Nil	Hæmorrhagic case; died on 7th day
6	Nil	6th	No pustulation	Nil	Hæmorrhagic case; died on 12th day; vesicles dried up
7	Infancy	6th	No true pustula- tion	4th day	Recovered. Scabs dried and dropped off leaving no pitting by 12th day
8	Infancy	3rd	No pustulation	5th day	Recovered with no pitting
9	Nil	8th	Nil	Nil (complic- ated by malaria B.T.)	Very severe confluent case. Recovered with severe pitting
10	Infancy	7th	Nil	3rd day	Recovered, some scarring
11	Infancy	8th	Pustules developed but dried up rapidly	3rd day	Recovered, no pitting and very slight scarring. Complicated by neuritis
12	Infancy	4th	No true pustula- tion	4th day	Severe case, no pitting, few pigmented scars. Complication iritis

*Vaccinated 11 days before onset.

subsequent convalescence was straightforward apart from a succession of boils which were eventually cured by an autogenous vaccine.

Of the other eleven cases treated, three died (two of these were hæmorrhagic cases which are almost invariably fatal). It was considered that sulphathiazole had inhibited or modified pustulation in *five* cases. A sixth case died on the seventh day without pustulating but in toxic cases pustulation may be delayed. The effect on the focal lesions was striking. The vesicles, instead of becoming tense and increasingly convex, collapsed as their contents were absorbed, finally leaving only an empty shell. As a result there was no *pitting* in these cases and scarring was minimal. It was quite obvious even from this small series that in order to produce this effect the sulphathiazole should be started well before pustulation is established which in our cases was usually about the eighth day.

The general effects of sulphathiazole upon the secondary toxic stage were equally definite. The temperature was usually normal by the fourth day of treatment, instead of persisting for seven to ten days, as in untreated cases, but even more striking was the remarkable improvement in the patients' general condition and mental outlook within

some forty-eight hours of starting treatment, an effect certainly not seen in the sulphapyridine treated cases.

Conclusions.—Though the number of patients treated has been far too small to present anything approaching conclusive evidence, those of us who have had charge of the smallpox cases during this outbreak have been sufficiently impressed by the effects of sulphathiazole to regret deeply that this treatment had not been given from the beginning. It is felt that it is a far more hopeful remedy than xylol or sulphapyridine and, from the accounts given, more certain in its action than sulphanilamide. It is possible that some of our fatal cases who died in the secondary toxic stage might have been saved. Certainly much disfiguring pitting and scarring could have been prevented.

Summary.—During an outbreak sixty-eight British soldiers were admitted to an Indian Base Hospital (B.T.) with smallpox. Twenty-two were major cases. Ten patients died.

Staph. aureus was consistently cultured from smallpox pustules.

Xylol treatment (oral) was given an extensive trial. Results were unimpressive.

Sulphapyridine did not appear to influence the disease.

Sulphathiazole was given to twelve major cases. Results suggest that this drug is more effective than the other sulphonamides and that it merits further trial.

I am indebted to Colonel G. Moulson for permission to forward this note.

REFERENCES.

- HAUGHTON, S. G. S. (1939). "Tropical Diseases."
WILKINSON, P. B. (1942). *Lancet*, ii, 67.

THE EFFECTS OF THE COMMON ANÆSTHETICS ON THE CIRCULATION.

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FOR some time previous to the War great interest has been taken in the effects of general anæsthesia on the heart and circulation. All the general anæsthetics have, to a greater or lesser extent, a depressant effect on the circulation though the effect is not always noticeable at the time of operation and indeed may not show itself until several days later.

The majority of the experimental work on anæsthetics has been done on animals and requires clinical confirmation. This can only be obtained by the keeping of accurate records of all patients who have been given an anæsthetic whether the operation be a serious one or not. A knowledge of the blood-pressure and pulse reactions to general anæsthesia helps much in the early diagnosis of shock. The importance of a correct choice of an anæsthetic in cases of gas poisoning is evident.

Ether and, unfortunately, chloroform are still two of the most commonly used anæsthetics. Both have, in varying degrees, toxic effects on heart muscle and on the peripheral blood-vessels. The apparent initial stimulant effect of ether on the circulation is not maintained for long. Anyone who has by accident or design attempted to inhale an anæsthetic concentration of ether will agree that the stimulant effect on the circulation can be accounted for by the severe irritation of the air-passages and the effect is replaced later by gradual circulatory depression. The early stimulant effect of ether does not occur with chloroform and a fall of blood-pressure occurs with this drug right from the beginning. Both paralyse the heart muscle in mammals though the relative toxicity of the two narcotics, as assayed by Cushing, indicates that chloroform is twenty-five times more toxic to heart muscle than ether. The paralysis begins in the auricles (Embley) [1] and later spreads to the ventricles but vagal stimulation will cause cardiac arrest before the drug reaches lethal concentration. Here is the usual cause of death from chloroform overdosage but asphyxia due to respiratory failure complicates the picture in the case of ether. In both cases the signs of overdosage are bradycardia, an irregular pulse and a marked fall in blood-pressure. Such overdose, even in skilled hands, can occur with chloroform and this is not surprising when it is realized that in the Starling heart-lung preparation 20 to 40 mgm. per cent chloroform in the perfusing fluid will cause a marked diminution in cardiac output while 18 to 40 mgm. per cent is necessary for deep narcosis and 25 to 30 mgm. per cent is necessary for surgical anæsthesia. This margin of safety is extremely small and might easily be exceeded during induction in a robust patient (Buckmaster and Gardner) [2].

Mixtures of chloroform and other narcotics give no guarantee of safety and it has been shown by Anderson (1932) [3] that similar effects follow the use of A.C.E. mixtures. Oncometric examination of the heart under ether shows a continuous dilatation from the beginning of induction although little or no diminution in cardiac output or blood-pressure occurs until much later (Cattell) [4]. It is hardly necessary to say that no warning of the effects of this drug on the heart need be given by the pulse. Blalock [5] demonstrated, however, in dogs a distinct increase in cardiac output associated with tachycardia. This is explained as due to sympathetic stimulation and a vagal inhibition with associated liberation of adrenaline. The theory that vagal inhibition under ether does occur is supported by Samaam (1935) [6] who states that adrenaline injection does not cause bradycardia while vagal section in the neck has no influence on the cardiac rate. Cutting of the sympathetic nerves reduces the tachycardia. Tachycardia in human subjects is common during light surgical anæsthesia.

Chloroform produces neither tachycardia nor a rise in blood-pressure but it has some very unpleasant side effects. The well-known experiments of Levy [7] in 1923 demonstrated the serious effects of chloroform on heart muscle. He showed that besides the ordinary effects

of overdosage a type of cardiac arrest occurs early in induction and during light narcosis. This is a ventricular fibrillation. It may, but need not always, be preceded by tachycardia and extrasystoles. There is a phase of increased excitability and the refractory period of heart muscle is shortened. It is easy to realize that under such conditions a trigger action will occur through sympathetic stimulation induced by asphyxia and struggling and this has been confirmed by experimental work on animals. The cardiac output under ether and chloroform is also reduced by occasional extrasystoles, possibly also a sympathetic effect, since Brow [8] has discovered an area in the hypothalamus stimulation of which will produce extrasystoles.

The use of the electrocardiograph has demonstrated that extrasystoles occur much more frequently than had previously been suspected. Premature beats, tachycardia of ventricular and auricular origin, sinus arrhythmia and delayed auriculo-ventricular conduction time have all been noticed but it is difficult to separate the effects of the anæsthetic drug and the effects of asphyxia during induction.

Cardiac depression is not confined to ether and chloroform. Ward and Wright [9], in experiments on healthy volunteers, showed that nitrous oxide given without oxygen for short periods greatly depresses the ventricular myocardium.

The danger of "Dental Gas" given to persons with a weakened heart has long been known. But ethylene, nitrous oxide with oxygen, cyclopropane, vinyl ether and avertin all produce their quota of irregularities. Indeed, during induction with cyclopropane the slow pulse makes irregularities easily detectable. However, such irregularities need not always be regarded as signs of circulatory depression (Lennox, Graves and Levine [10]). The cardiac side effects of cyclopropane are naturally of great interest as the survival of this drug as an anæsthetic depends ultimately on its freedom from cardiac damage. Kurtz [11] with the electrocardiograph noted a multiple focus ventricular tachycardia in 10 per cent of patients under cyclopropane. This abnormality is the precursor in chloroform narcosis of ventricular fibrillation. Increase in depth increases the incidence of such abnormalities and Waters has noticed a true cardiac paralysis with high concentrations of the gas. He, however, used over 50 per cent, an amount not likely to be used clinically. Hewer [12] on the other hand strongly advocates cyclopropane in severely shocked patients requiring immediate operation.

Ethyl chloride produces cardiac damage similar to chloroform (Kennedy, 1930). Ethylene and nitrous oxide apart from the arrhythmia mentioned above produce no permanent cardiac injury but avertin, although it has a much wider margin of safety than chloroform, has a somewhat similar effect on the heart (Sollman, 1936 [13]). In its cardiac effects it comes between chloroform and ether, being safer than the former and not so safe as the latter drug. In view of this it is difficult then to understand its wide use in toxic goitre.

The barbiturates have been recommended for the anæsthetization of shocked subjects and experimental work on animals by Seeley, Essex and Mann [14] indicated that amytal delays the appearance of shock following intestinal manipulation under ether, but Adolph and Gerbasi [15] have shown that this drug causes an increase in blood dilution—probably due to a transudation of lymph into the capillaries following the fall in blood-pressure. Cushing, however, states that the fall in blood-pressure under the barbiturates is due to a direct cardiac effect. Mugg [16] studying the effects of veritol on the circulation noted a 35 per cent diminution in the cardiac minute volume, raised right auricular pressure and cardiac irregularities following the perfusion with the barbiturate pernocton and similar effects have been noted in the case of evipan.

The interpretation of the experimental results in animals and their application in clinical anæsthesia is made difficult by the omission of the estimation of the depth of the anæsthesia or the blood concentration of the narcotic used.

Peripheral Circulatory Effects of Anæsthetics.—Increasing interest is being taken in the peripheral vascular effects of anæsthetics. In the case of ether there appears to be a distinct loss of vasometer tone particularly in the extremities. The lower limbs show an increase in the skin temperature and measurement by Rhein's flowmeter shows an increase in arterial blood flow. Strangely enough, under light anæsthesia, the blood flow in the peripheral

arteries is greater than under deep anæsthesia and it is presumed that the fall in blood-pressure associated with the cardiac effects of deep ether narcosis reduces the peripheral flow. Herrick [17] states that ether abolishes vasometer tone in the lower extremities. The cerebral vessels are dilated but the intestinal blood-vessels are constricted.

Chloroform, not only by its direct action on the heart but by causing peripheral arterial paralysis, causes a fall in blood-pressure. Cushing claims a direct action on the muscles of the arterioles but there is evidence of paralysis of the vasometer centre. Avertin, depending on the depth of anæsthesia induced, has both a central and peripheral dilator action on the blood-vessels (Nowak, 1934 [18]). Nitrous oxide, ethylene and cyclopropane have no action on the blood-vessels though the last is frequently blamed for excessive bleeding during surgical operations.

Spinal anæsthesia affects the circulation, in the main, peripherally. In man the vasomotor centre is highly developed because of his erect posture and, indeed, some animals are likely to die from cardiac insufficiency if maintained for some time with their head much above the rest of the body.

The central nervous system exercises this control through two main pathways—the sympathetic and the parasympathetic. Twin chains of ganglia commence in the neck and run down on either side of the vertebral column through thorax and abdomen to the pelvis. These ganglia receive efferent fibres, white rami communicantes, from the spinal cord via the anterior roots of the spinal nerves from the 1st thoracic to the 2nd or 3rd lumbar segments and synapse with the paravertibral ganglia opposite above and below. Due to this widespread distribution in the sympathetic nerve chain blocking of even a single segmental group of such fibres can cause widespread effects.

These efferent nerves carry all the vasomotor impulses from the centre in the brain to the entire body so blocking of the efferent nerves from the 1st thoracic to the 3rd lumbar segments will cause vasodilation practically all over the body.

The grey rami communicantes arise from the ganglionated sympathetic cord and proceed *via* the spinal nerves to their destination, the arterioles of the somatic circulation. The grey rami obviously cannot supply vasoconstrictor impulses if the white rami are blocked as occurs with a spinal anæsthetic. The number of vasoconstrictor nerves put out of action depends on the extent of the anæsthetic or motor block. Included in the sympathetic system are the three cardiac accelerator nerves. Stimulation of these nerves speeds up the heart rate and, since their origin is from the upper thoracic white rami, they may be blocked by a high spinal anæsthetic. Should this occur bradycardia might be expected as the vagal parasympathetic influence is unopposed.

Fibres from the 5th thoracic nerves downwards form the splanchnic nerves. Blocking of these nerves by spinal anæsthesia produces, among other effects, dilatation of the abdominal vessels and a fall in blood-pressure. Fibres *via* the upper three lumbar nerves control the vessels of the kidneys, spleen, colon and genito-urinary tract and spinal block in this region causes only a slight fall in blood-pressure perhaps because the parasympathetic nerves are simultaneously affected. The vasomotor nerves to the arms come from the 4th to the 10th thoracic segments, to the legs from the 11th thoracic to the 2nd lumbar segments.

The fall in blood-pressure under spinal anæsthesia can be most reasonably explained by the above-mentioned effect of the anæsthetic on the sympathetic nervous outflow from the spinal cord. The fall in pressure begins about fifteen minutes after injection and reaches its lowest point about half an hour later. A gradual recovery then takes place provided hæmorrhage or shock do not, in the meantime, occur. The fall in pressure, other factors being equal, depends on the number of white rami paralysed, i.e. on the height of the motor block. A high spinal anæsthesia will reach the 4th or 5th thoracic segments and, since the lower cardiac accelerator segments arise from this area, bradycardia is not uncommon but this need not be alarming unless a severe fall in blood-pressure occurs (Maxson [19]). Ferguson and North [20] state that the degree of blood-pressure fall can be estimated by the degree of bradycardia. However, a severe fall in blood-pressure is more likely to produce tachycardia.

Paralysis of the intercostal muscles of the chest by embarrassing cardiac filling is, in the opinion of Maxson, a definite factor in blood-pressure fall—the less inspiratory movement the less the "*vis a fronte*" in the great veins and the slower the blood flow towards the heart. Heymans (1933) [21] has made an interesting study of the effects of spinal anæsthesia in dogs. He showed that with spinal block to the level of the umbilicus no appreciable fall in blood-pressure occurred but the vasomotor control by the carotid sinus was suppressed or diminished.

Loss of general muscular tone, fall in intra-abdominal tension, cerebral anæmia and absorption of the drug into the circulation may be necessary factors in blood-pressure fall

but I think there is no doubt that the main factor is vasomotor nerve paralysis in the sub-arachnoid space.

Anæsthesia and Shock.—The profound effects of spinal anæsthetics on the nervous control of the arteries has been shown in some detail above. General agreement as to the cause of shock has not been reached but one effect of shock is a loss of tone in the small blood-vessels. Now ether, chloroform and spinal anæsthesia have a profoundly deleterious effect on the vasomotor system but it is also of practical importance to remember that, in the case of the first two drugs, the cardiac reserve is also diminished while the third prevents the nervous control designed to compensate for shock and hæmorrhage from acting. Most authorities, therefore, rightly state that these three anæsthetics should not be used in cases of imminent or developed shock.

Shocked animals show quite a different reaction to ether from normal animals—the initial fall in blood-pressure in cats under ether anæsthesia is progressive if shock develops and the blood-pressure falls to zero (Cattell [4]). Overdosage of narcotics can cause a marked fall in blood-pressure but this effect is reversible and, if the depth of anæsthesia be reduced, a rapid return to normal occurs. Anæsthetics plus trauma have quite a different effect—the blood-pressure recovery being retarded or prevented—such a condition we know as shock. Since Crile's work in the prevention of operative shock by local anæsthesia combined with gas and oxygen much attention has been given to the search for a general anæsthetic which will, if not prevent, at least not increase shock. We cannot say that such an anæsthetic has been found though gas and oxygen, ethylene, and cyclopropane approach nearest the ideal. Jarman advocates the use of the intravenous barbiturates in shock and there is experimental evidence for his view. Seeley, Essex and Mann (1936) [14] compared the shock producing effects of ether and the barbiturates—they report in favour of the latter and even state that amytal can delay the onset of shock produced by intestinal manipulations under ether.

The toxic variety of shock (McDonald) shows a hæmoconcentration and definite changes in blood concentration occur with ether. Seeley, Essex and Mann record under ether an 18 per cent increase in cell volume, a 19 per cent increase in hæmoglobin and a 15 per cent increase in erythrocyte counts with an increase in the specific gravity of the blood. As regards the permeability of the capillaries, considered so important in toxic shock, investigators into the basic action of anæsthetics agree that cell permeability is decreased by narcotics but the removal of the narcotic is at once followed by a marked increase in the permeability of the cell membrane. Since transfer of fluid from the blood to the tissues, lymph spaces and body cavities is through the cells of the capillary bed, anæsthetics, by this local activity, can, where the first effect has worn off, considerably increase this flow. Perhaps this effect has a considerable influence on the development of shock.

Blalock [22] has shown that the type of shock produced by crush injuries of the limbs can be explained as a hæmorrhage or loss of plasma into the injured limb and this loss of fluid is sufficient to account for the resulting fall in blood-pressure. Compensation for this loss is fairly good at first and no marked fall in blood-pressure occurs but only because the remaining organs of the body are starved of blood by severe vasoconstriction. Anything which interferes with this vasoconstriction, e.g. spinal block, chloroform, will cause the immediate appearance of clinical signs of severe shock. Bleeding experiments have shown that not until about 60 per cent of the total blood volume is lost does a marked fall in blood-pressure occur. This marked fall in pressure occurs when the essential structures of the body are beginning to lose their blood supply and eventually the vasomotor centre fails and all control of the blood vessels is lost. Spinal anæsthesia prevents this compensation by its peripheral nervous action, chloroform and ether probably by direct action on the vasomotor centre. The blood-pressure must not be taken as an infallible guide to the degree of shock and when the fall *does* occur the patient has already exhausted his reserves. McDowell's [23] opinion that "the individual who gives an anæsthetic such as ether or chloroform in obviously toxic shock is guilty of little short of homicide" has a sound experimental basis.

As long ago as 1911 Cannon and Hoskins [24] found an increased output of adrenaline in rats and rabbits following the stimulation of the sciatic nerve and noted adrenaline exhaustion as a possible factor in the production of shock but this action, mentioned also by other workers, has not been proved. The advocates of the neurogenic theory of shock suppose a long sympathetic pressor effect followed by an inhibited or depressed state due to exhaustion (O'Shaughnessy and Gloyne). Freeman (1933) [25] showed that continuous adrenal infusion in rats produces blood concentration and a reduced blood volume, two of the principal characteristics of toxic shock. It is suggested that this state is due to asphyxia of the capillaries, damage to their walls and a consequent irreversible loss of fluid. Elliott (1912) [26] demonstrated that ether alone can reduce the epinephrine content of the adrenal glands if the splanchnic nerves are left intact. Section of the nerves prevented this effect and further experiments using chloroform showed a similar action. Urethane, an anæsthetic frequently used in animal experiments, gave the same result. Maes (1936) [27] showed that ether diminished the action potential of the splanchnic nerves but Grollman (1936) [28] is of opinion that anæsthetics inhibit the reflex output of adrenaline. When it is remembered that ether and chloroform cause peripheral vasodilation certainly in the lower extremity (Herrick [17]), it can be realized that the experimental evidence is conflicting.

This summary of the pharmacology, in relation to the circulation, of the common general anæsthetics, indicates that they can aggravate or initiate shock apart altogether from the effects superimposed by a severe injury or operation. Cyclopropane, ethylene, nitrous oxide and perhaps the barbiturates if used skilfully would appear to be the least injurious to the circulation on whose maintenance recovery from severe injury so largely depends. It is necessary again to emphasize that ether, and particularly chloroform, not only cause peripheral circulatory damage but can injure the heart muscle directly. The toxic effect of an improperly chosen or badly administered anæsthetic may well lead to the loss of a patient who might have been saved by surgical intervention. Here I might mention the value of continuous blood-pressure readings being charted at short intervals during operations. Besides their statistical value an early rise in blood-pressure will often precede the fall due to shock so giving early warning that counter measures are necessary.

It is hoped that this article will convince the surgeon that the specialist anæsthetists, dislike of chloroform and ether is not wholly a prejudice but has a sound pharmacological basis.

REFERENCES.

- [1] EMBLEY. *Journal of Physiology*, **32**, 147.
- [2] BUCKMASTER and GARDNER. *Proc. Roy. Soc.*, S.B., 1907, **79**, 555.
- [3] ANDERSON, R. M. *Anæsth. and Analgesia*, 1932, **11**, 276.
- [4] CATTELL, McK. *Arch. Surg.*, 1923, **6**, 41.
- [5] BLALOCK, A. *Ibid.*, 1927, **14**, 732.
- [6] SAMAN, A. *Arch. internat de pharmacodyn et de therap.*, 1935, **50**, 101.
- [7] LEVY, A. G. *Proc. Roy. Soc. Med.*, 1923, **16**, 30.
- [8] BROW, G. R., LONG, C. L. H., and BEATTIE, J. *J.A.M.A.*, 1930, **95**, 715.
- [9] WARD, G. E. S., and WRIGHT, S. *Lancet*, 1929, **2**, 1184.
- [10] LENNOX, W. G., GRAVES, R. C., and LEVINE, S. A. *Arog. Int. Med.*, 1922, **30**, 57.
- [11] KURTZ, C. M., BENNETT, J. H., and SHAPIRO, H. H. *J.A.M.A.*, 1936, **106**, 434.
- [12] HEWER. *British Journal of Surgery*, April, 1941.
- [13] SOLLMAN, T. "A Manual of Pharmacology," 5th Edn., 1936.
- [14] SEELEY, S. F., ESSEX, H. E., and MANN, F. C. *Annals of Surgery*, 1936, **104**, 332.
- [15] ADOLPH, E. F., and GERBASI, M. J. *Am. J. Physiol.*, 1933, **106**, 35.
- [16] MUGG, E. *Klin. Woch.*, 1937, No. 36.
- [17] HERRICK, J. F., ESSEX, H. E., and BALDES, R. J. *Am. J. Physiol.*, 1932, **101**, 213.
- [18] NOWAK, S. J. G. *Compt. rend. Soc. de Biol.*, 1934, **116**, 642.
- [19] MAXSON. "Spinal Anæsthesia," 1938. *Philad., London, etc.*
- [20] FERGUSON and NORTH. *Surg. Gynec. Obstetrics*, **54**, 621, 1932.
- [21] HEYMANS, C., BOUCKAERT, J. J., and BERT, P. *Compt. rend. Soc. de Biol.*, 1933, **112**, 714.
- [22] BLALOCK, A. *Arch. Surg.*, 1927, **15**, 762.
- [23] McDOWELL. *B.M.J.*, 1923, 1940.
- [24] CANNON, W. B., and HOSKINS, R. S. *Am. J. Physiol.*, 1911, **29**, 274.
- [25] FREEMAN, N. E. *Ibid.*, 1933, **103**, 185.
- [26] ELLIOTT, T. R. *J. Physiol.*, 1912, **44**, 374.
- [27] MAES, J. *Compt. rend. Soc. de Biol.*, 1936, **123**, 528.
- [28] GROLLMAN, A. "The Adrenals," Baltimore, 1936.

THE INVESTIGATION OF OUTBREAKS OF DYSENTERY AT A MILITARY HOSPITAL IN SOUTH AFRICA.

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SHORTLY after the opening of a military hospital, cases of "gastro-enteritis" were observed to occur amongst the patients and staff. The majority of cases showed mild symptoms, varying in duration from twenty-four hours to seven or eight days. It soon became evident that two clinical types of cases were occurring—the one type, in which the patient passed from three to twenty liquid stools in twenty-four hours and after about twenty-four to forty-eight hours appeared to recover completely; the second type, in which the attack was usually ushered in by violent vomiting and frequent loose stools, persisting for seven or eight days. The latter type of condition did not occur amongst bed-patients but was noted amongst the staff and convalescent patients who were not confined to the hospital premises.

In both types the majority of the stools passed were liquid, brown in colour, containing faecal matter and varying quantities of mucus. Macroscopic blood was occasionally observed but in the majority of cases blood was only found on microscopic examination. In a few cases the stools consisted entirely of blood-stained mucus.

The microscopic examination showed that in the majority of cases the exudate was cellular and was either "bacillary" or "indefinite." The microscopic appearance of the stools was of great value as, by means of this type of examination, it was possible for a diagnosis of "bacillary dysentery" to be suspected in the majority of cases long before the causative organisms were isolated. Because of this early diagnosis, the epidemiological investigation of the outbreaks was facilitated and the treatment of the patients was instituted at the earliest possible stage of the infection.

As cases of mild "gastro-enteritis" were reported as occurring in the neighbouring towns, it was clear that this type of infection occurring in hospital staff and convalescent patients could be acquired on visits to these towns. On the other hand, infections amongst bed-patients could not be acquired in this way. Epidemiological data pointed to milk as the vehicle of the infection occurring amongst patients confined to bed.

EXPERIMENTAL.

(a) *Investigation of Cases.*—The stool examinations were carried out by the methods described by Finlayson (1942). Several epidemics were investigated during the period June–October, 1942. Altogether 95 stools from 76 cases were examined. This number of cases was, however, only a proportion of the number of cases occurring as in one outbreak alone 125 cases were observed. In 28 of the 95 stools examined the exudate was "bacillary." The other 67 stools showed an "indefinite" exudate. From 11 cases *B. dysenteriae* Flexner was isolated, whilst from 14 cases *B. dysenteriae* Sonne was isolated. The *B. dysenteriae* Flexner strains showed the morphological characters of the *B. dysenteriae* Flexner group of bacteria and gave the biochemical and fermentation reactions of this group. They were all agglutinated strongly and specifically by Flexner I and II polyvalent antisera prepared at the R.A.M. College.

The *B. dysenteriae* Sonne strains conformed in morphological and cultural characters and biochemical reactions to *B. dysenteriae* Sonne. They were strongly and specifically agglutinated by *B. dysenteriae* Sonne antisera prepared at the R.A.M. College.

It was observed that, although *B. dysenteriae* Sonne was isolated from outbreaks of dysentery occurring amongst the staff, and from sporadic cases occurring amongst convalescent

TABLE.—RESULT OF ROUTINE MILK EXAMINATIONS

Date	B. coli count	Total bacterial count	Remarks
29. 7.42	Presumptive <i>B. coli aerogenes</i> present in	over 500,000 per c.c.	
6. 8.42	" " " " " "	1,170,000 "	
14. 8.42	" " " " " "	580,000 "	
20. 8.42	" " " " " "	40,000 "	
25. 8.42	" " " " " "	190,000 "	
2. 9.42	" " " " " "	170,000 "	
10. 9.42	No Presumptive <i>B. coli aerogenes</i> present in	140,000 "	
19. 9.42	" " " " " "	4,000 "	
26. 9.42	" " " " " "	70,000 "	
1.10.42	" " " " " "	40,000 "	
1.10.42	Presumptive <i>B. coli aerogenes</i> present in	70,000 "	
11.10.42	No Presumptive <i>B. coli aerogenes</i> present in	750,000 "	
15.10.42	" " " " " "	160,000 "	
21.10.42	" " " " " "	380,000 "	<i>B. dysenteriae</i> Flexner isolated
28.10.42	" " " " " "	3,000 "	No dysentery bacilli isolated
4.11.42	Presumptive <i>B. coli aerogenes</i> present in	290,000 "	" " " "
12.11.42	No Presumptive <i>B. coli aerogenes</i> present in	30,000 "	" " " "
18.11.42	" " " " " "	40,000 "	" " " "
27.11.42	" " " " " "	8,000 "	" " " "
2.12.42	Presumptive <i>B. coli aerogenes</i> present in	5,000,000 "	On previous day, native workers were on strike. No dysentery bacilli were isolated
		(over 20,000,000)	
9.12.42	" " " " " "	over 10,000 per c.c.	No dysentery bacilli isolated
18.12.42	" " " " " "	11,000 "	" " " "
22.12.42	" " " " " "	16,000 "	<i>B. dysenteriae</i> Flexner isolated
31.12.42	" " " " " "	19,000 "	No dysentery bacilli isolated
11. 1.43	" " " " " "	15,000 "	" " " "
15. 1.43	No Presumptive <i>B. coli aerogenes</i> present in	12,000 "	" " " "
20. 1.43	Presumptive <i>B. coli aerogenes</i> present in	90,000 "	" " " "
30. 1.43	" " " " " "	580,000 "	" " " "
8. 2.43	" " " " " "	105,000 "	" " " "
NOTE.—On 1.10.42 <i>B. dysenteriae</i> Flexner was also isolated from milk obtained from a ward.			
" 23.10.42 " " " " " the hospital kitchen.			

patients who were allowed leave from the hospital, this organism was not once isolated during an outbreak of dysentery occurring amongst patients confined to bed. In all cases of bed-patients, who acquired a dysenteric infection at the hospital, the organism isolated was identified as being of the *B. dysenteriae* Flexner group.

(b) *Investigation of Source of Infection.*—Various foodstuffs, including fish and meat, were examined in an attempt to isolate dysenteric organisms. The results of these examinations were all negative.

Epidemiological data pointed to the milk supply as the possible source of infection. Routine bacteriological examinations of the milk supplied to the hospital had been carried out at weekly intervals since the end of July, 1942. As will be seen from the Table, a considerable variation in the bacterial content and in the number of presumptive *B. coli aerogenes* was detected, although all milk supplied to the hospital was said to be pasteurized.

Special examinations of milk for the presence of dysentery bacilli were carried out using the following technique. The milk was centrifuged at 2,000 r.p.m. for five minutes. Loops from the cream, middle layer and deposit were plated out on McConkey agar and incubated overnight. Suspicious colonies were picked off and further examined as in the case of colonies isolated from stools.

On four occasions dysentery bacilli with the characters of *B. dysenteriae* Flexner were isolated from milk. On 1.10.42 this organism was isolated from milk taken from a ward in which a number of cases of dysentery had occurred. On 21.10.42 *B. dysenteriae* Flexner was isolated from a sample of milk taken from an unopened milk can immediately after its arrival at the hospital. On 23.10.42 this organism was isolated from a can of milk obtained from the main hospital kitchen. On 22.12.42 the organism was again isolated from a sample taken from an unopened can of milk immediately after its arrival at the hospital.

It is of interest to note that, although *B. dysenteriae* Flexner was isolated from milk supplied to the hospital on 21.10.42, the total bacterial count of this milk showed the presence of 380,000 bacteria per c.c. and no presumptive *B. coli* in 0.1 c.c. The milk examined on 22.12.42, and from which *B. dysenteriae* Flexner was isolated, showed a total bacterial count of 16,000 per c.c. and presumptive *B. coli* present in 0.1 c.c. It would appear, therefore, that the total bacterial count and the presumptive *B. coli* count give no indications of the presence or absence of dysentery organisms in the milk.

On 2.12.42 a sample of milk was examined and showed a total bacterial count of over 5,000,000 bacteria per c.c. (a rough count gave over 20,000,000 bacteria per c.c.) and presumptive *B. coli* present in 0.001 c.c. This sample of milk was supplied to the hospital on the morning following a strike of native employees in the milk trade. The findings throw some light on the degree of contamination of the milk supplied to the hospital when, presumably, it had not been pasteurized. Incidentally, no dysentery bacilli were isolated from this milk. It should be pointed out, however, that even with the most satisfactory technical methods the isolation of dysentery bacilli is a delicate procedure and the fact that none of these organisms was isolated from a particular specimen does not mean that they were not present.

DISCUSSION.

The bacteriological findings in the investigation of outbreaks of dysentery show that two clinical types of the disease occurred. The one, usually very mild, was associated with dysentery organisms which corresponded to *B. dysenteriae* Flexner; the other, more severe, was associated with the presence of *B. dysenteriae* Sonne. Both types would be described in South Africa as "appelkoos-siekte" or "apricot sickness" of varying severity. Buchanan and Roux (1930) described the isolation of *B. dysenteriae* Sonne from cases of mild dysentery occurring on the Witwatersrand and pointed out the resemblance of these cases to the condition described as "apricot sickness."

It was noticeable that the more severe cases associated with the presence of *B. dysenteriae* Sonne occurred only amongst hospital staff and patients who were not confined to bed. Although a number of outbreaks of dysentery occurred amongst bed-patients, the only dysentery organisms isolated were identified as *B. dysenteriae* Flexner strains.

In view of the *B. dysenteriae* Sonne type of infection occurring amongst staff and patients who were able to leave the hospital, it was not possible to identify the exact source of this type of infection. It was clear, however, that this infection was being acquired outside the hospital as no cases of this type of infection were observed as occurring amongst bed-patients in the hospital.

Investigations of food and milk supplied to the bed-patients disclosed the presence of *B. dysenteriae* Flexner strains in the milk supplied to the hospital. During the period 1.10.42 to 22.12.42 *B. dysenteriae* Flexner was isolated from four different samples of milk and two of these samples were taken from unopened cans of milk immediately after their arrival at the hospital. It is therefore clear that the milk was contaminated prior to its arrival at the hospital and was not infected on the hospital premises.

Instructions were issued to the effect that all milk used in the hospital was to be boiled. In spite of these instructions, cases of dysentery from which *B. dysenteriae* Flexner was isolated continued to occur amongst the bed-patients. On investigation it was noted that these cases were occurring only amongst patients who were receiving a "high caloric" diet. This diet contained a high proportion of cream which was neither pasteurized nor boiled. On October 19 the use of cream in the hospital was prohibited and since that date no case of dysentery has been observed amongst bed-patients at the hospital. Since a period of four months has elapsed since the stoppage of the supply of cream to patients and since *B. dysenteriae* Flexner has been isolated from milk during that period (on 22.12.42), it is reasonable to assume that the cases of dysentery from which *B. dysenteriae* Flexner was isolated were due to the ingestion of infected milk or cream and that the outbreaks were terminated by the enforced boiling of all milk and the stoppage of the supply of cream to the hospital.

During the period when these investigations were carried out, cases of "gastro-enteritis" were commonly reported as occurring in nearby towns. A sample of stool obtained from an adult who developed dysentery yielded *B. dysenteriae* Flexner in October and on 16.11.42 this organism was isolated from the stools of a child who had also developed this condition. Incidentally the parents of the child were emphatic in incriminating milk as the source of the infection, as this was the only food consumed by the child which was not consumed by other members of the family.

There seems no possible doubt that dysenteric infections are spread by the consumption of milk (amongst other sources). Bevan (1941) has shown that the chief cause of infantile mortality in South Africa is "infantile diarrhoea" and there is no doubt that in the majority of cases this condition is a dysentery. It is not surprising that "infantile diarrhoea" is rife in South Africa when milk—the chief source of the infant's diet—is contaminated with dysentery bacilli.

The importance of boiling all milk, unless pasteurized efficiently, cannot be over-emphasized. The average South African native infected with a mild dysentery looks upon this condition as being more beneficial than otherwise. As the bulk of the handling of milk supplies is carried out by natives, it is not difficult to conceive how milk can be infected by a milk-handler who may be a carrier of dysentery bacilli, no matter how temporary the carrier state may be.

Although no dysentery bacilli were isolated from cream or "high caloric" diets which were investigated, the dramatic and complete cessation of dysentery amongst bed-patients coinciding with the stoppage of the admission of cream into the hospital cannot be overlooked. With cream implicated as a vehicle of infection, the advisability of restricting the consumption of cream and ice-cream during outbreaks of dysentery or "apricot sickness" should also receive consideration.

SUMMARY.

(1) Seventy-six cases of dysentery occurring over a period of six months were investigated. *B. dysenteriae* Flexner was isolated from eleven of these cases and *B. dysenteriae* Sonne was isolated from fourteen cases.

(2) *B. dysenteriae* Flexner only was isolated from cases occurring amongst bed-ridden patients.

(3) *B. dysenteriae* Flexner only was isolated on four occasions from the milk supplied to the hospital.

(4) No cases of dysentery occurred amongst bed-patients after the enforcement of instructions that all milk should be boiled and the stoppage of the supply of cream to the hospital.

ACKNOWLEDGMENTS.

I have to thank the Director-General of Medical Services for permission to forward this communication ; also Lieutenant-Colonel D. L. Ferguson for his help and interest in this investigation. I am indebted to Colonel J. S. K. Boyd for the supply of dysentery antisera.

BIBLIOGRAPHY.

- BEVAN, C. DE V. (1941). *Publ. Hlth.*, **5**, 6.
 BUCHANAN, G., and ROUX, P. (1930). *S.A. Med. Journ.*, **4**, 685.
 FINLAYSON, M. H. (1942). *Ibid.*, **16**, 251.

COMMENTS FROM THE PUBLIC HEALTH POINT OF VIEW ON MAJOR M. H. FINLAYSON'S PAPER

By Lt.-Col. DUNCAN L. FERGUSON, M.B., Ch.B., D.P.H.

On investigation of these outbreaks, the only common factors in the diet of the patients were milk and cream. At what point before delivery at the hospital the milk became contaminated has not been determined.

It is important to note that in this investigation neither the total bacterial count nor the examination for *B. coli* gave any definite indication of the presence of *B. dysenteriae* Flexner in the milk.

The boiling of all milk and the stoppage of the use of cream in the hospital has been followed by freedom from similar outbreaks.

Pasteurization properly carried out would be more satisfactory than boiling. In pasteurization attention to the following fundamental principles is required, viz. :—

- (1) All milk coming into the dairy must be pasteurized before distribution, otherwise equipment will become contaminated by raw milk.
- (2) The holding process is definitely the best.
- (3) Intelligent labour and management are essential.
- (4) Daily control of milk from every unit by phosphatase test is necessary.
- (5) Employees to be tested for various carrier states and to be well housed and looked after.
- (6) A good plant provides facilities for processing the milk in such a manner that it is not handled by the workers except when being poured into the unit in the first instance. Bottling and canning of the pasteurized product are carried out by machinery.

Boiling of milk in a big institution is inconvenient. For many members of the public it is impossible. Pasteurized milk is preferable from a nutritional point of view and is free from the "boiled" taste. It is a business procedure because it obviates wastage due to souring. It would be in the interest of the industry and of the public if pasteurization were introduced throughout South Africa.

The presence of *B. dysenteriae* Flexner in milk may have some bearing on the incidence of infantile diarrhoea which is one of the chief causes of the high infantile mortality rates recorded in the Union.

LIGHTNING AND THE CENTRAL NERVOUS SYSTEM.

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AND

MAJOR J. W. ALDREN TURNER,

Royal Army Medical Corps.

(From a Military Hospital for Head Injuries.)

FROM time to time lightning flashes have resulted in casualties in this country and some of them have been fatal but their number has been so small that little attention has been paid to them. In other countries, for instance in South Africa, lightning constitutes a definite menace to human life. We have recently had the opportunity of treating a case of lightning stroke within a few hours of the incident and it is described here not only because it presented unusual neurological features but also because it is infrequent for such a case to be investigated in hospital at such an early stage.

CASE HISTORY.

A pioneer, aged 39, was admitted to hospital at 23.00 hours on August 30, 1942, with the following history. At 18.15 hours during a thunderstorm a corporal and he had gone into a bell-tent; shortly after this the tent was struck by lightning and caught fire. The fire was rapidly extinguished and when the adjutant entered the tent a minute or two later he found the corporal dead with superficial burns in the form of a wide irregular network over the left thigh, hip and shoulder. The patient was unconscious but is said to have regained consciousness for a few minutes and then relapsed.

At 19.15 hours he was admitted to a general hospital where he was found to be conscious with the right arm and both legs rigid and the left arm flaccid. A slight tremor of the right arm was noted.

When transferred to a Military Hospital for Head Injuries at 23.00 hours he appeared to be aware of his surroundings but was mute. He co-operated fairly well in examination. The only external evidence of injury was a first degree burn on the front of the left thigh. In the central nervous system the fundi were normal and the pupils reacted to light and convergence. No abnormality was discovered in the cranial nerves. There was a constant rapid rhythmic tremor of the right arm, consisting of flexion and extension of the elbow, wrist and fingers—no element of pronation and supination was seen. The tremor was not abolished, even temporarily, by voluntary movement. Tone in the right arm was increased in flexor and extensor groups and was of a plastic type and there was *flexibilitas cerea* in the right arm. There was no impairment of voluntary power in arms or legs. Tendon-jerks were present and equal, plantar responses flexor and abdominal reflexes present and equal. No gross sensory impairment was found.

A lumbar puncture showed a pressure of 150 mm. ; the cerebrospinal fluid was clear and colourless and contained 50 mgm. of protein and 2 lymphocytes per c.mm.

By the next morning he was fully conscious but rather drowsy—he said that he remembered getting into the tent and then seeing a “big flash” and then no more till coming round in hospital that morning. There was still a rhythmic tremor of the right arm and increased tone in the right arm and both legs but these signs gradually diminished during the next twenty-four hours.

On September 1, 1942, i.e. on the second day after the stroke, the tremor had ceased but there was still some increase of tone in the affected limbs. An electroencephalogram showed occasional outbursts of relatively high voltage 7-8 a second waves of an “epileptic” type, occurring in the anterior part of both hemispheres and low voltage 6 a second waves in the frontal regions.

There was progressive improvement in his condition and no recurrence of the tremor.

By September 7, 1942, no increase of tone was discernable. On September 14, 1942, the electroencephalogram record was normal. He was given a course of graduated physical training and returned to duty on October 2, 1942.

COMMENTS ON THE CASE.

(1) From the neurological viewpoint the greatest interest lies in the transient appearance of undoubted signs of extrapyramidal damage; the tremor of the right arm lasted about twenty-four hours and the increased tone about seven days.

(2) The normal pressure and constitution of the cerebrospinal fluid within six hours of the lightning stroke is of interest; there appears to be little in the literature on lumbar puncture findings in the acute stages of lightning stroke.

(3) The electroencephalogram recorded thirty-six hours after the stroke was abnormal, showing occasional outbursts of relatively high voltage 7-8 a second waves in the anterior part of both hemispheres. A second record thirteen days later was normal.

(4) The good prognosis in this case and the absence of residual symptoms and signs is an encouraging feature.

DISCUSSION.

(1) *The Nature of Lightning.*—Lightning is the visible evidence of a discharge of electricity under extremely high tension, usually from a low lying thunder cloud to the earth. The latter is usually negatively charged while, in the cloud, there is an accumulation of positive charges resulting from atmospheric conditions. The single flash visible to the eye is in reality made up of a series of successive discharges, all following more or less the same path to the earth. It is probable that local variations in the humidity and temperature of the air influence the direction of the discharge. A full account of the physics of lightning will be found in the paper by Simpson (1930).

(2) *The Nature of Lightning Stroke.*—The effects of lightning on man naturally depend on his relationship to the main discharge, whether the current passes directly through him to the earth or whether he receives a "splash" off a nearby object carrying the main discharge, for example a tree. His degree of insulation from the ground is another important factor and, if this be high, electrocution may be prevented from taking place, especially from a "splash" discharge.

Though many of the effects of lightning stroke are accounted for by the passage of a current through the body, it must not be thought that this is the whole story as other results, for example the dramatic way in which every shred of clothing may be torn off, are more reasonably accounted for by the development of powerful electrostatic forces. These also probably account for the way in which a man may be hurled violently away from a nearby object which has been struck.

From these remarks it will be seen that the effect of a lightning stroke on man may be due to (i) electrocution, and (ii) electrostatic effects or, more commonly, a combination of the two.

(3) *Cerebral Pathology in Lightning Stroke.*—This has been described by Critchley (1934). The most prominent features are focal petechial hæmorrhages throughout the brain and wide dilatations of the perivascular spaces most marked in the brain-stem; in addition patchy chromatolysis is usually found. In some cases, as are also found after legal electrocution, (Hassin, 1933), there are large rents in the brain tissue and in the blood-vessels.

The mechanism of the production of these changes has been debated. Hassin considered that the cerebral damage is caused by a purely mechanical factor, similar to that in a severe head injury, but Blake-Pritchard (1934) pointed out that the only direct mechanical effect would be due to the electromagnetic force in the proximity of the current which would not be great enough to cause the lesions. He considered that the electrostatic effect was the important factor causing the repulsion of similarly charged particles.

(4) *Neurological Effects of Lightning Stroke.*—Critchley (1932 and 1934) has studied these from the clinical aspect. Loss of consciousness is common and there frequently is a short period of retrograde amnesia; whether this was present in our patient is uncertain as,

although his last memory was "a big flash," we do not know if this was the flash of lightning which struck him or a previous one.

Of the immediate sequelæ the commonest is paraplegia, called kerauno-paralysis by Charcot. This is accompanied by objective sensory disturbance and vasomotor changes but no competent neurological examination of a patient in the acute stage appears to have been recorded; the paraplegia usually starts to recover in one or two hours and its pathology is unknown.

Focal lesions in the brain occur, causing hemiplegia, dysphasia, etc., and in rare cases a spinal atrophic paralysis resembling progressive muscular atrophy in its clinical picture may appear weeks or months after the injury and be slowly progressive.

Our patient presented an extrapyramidal syndrome of short duration which is a very rare sequel of lightning injury. Critchley mentions that striatal symptoms such as choreo-athetosis may occur as a late complication and Young (1934-35) has described a progressive striatal picture with all the features of Wilson's disease starting three weeks after a lightning injury which caused loss of consciousness for thirty minutes. There is considerable doubt whether this case of Young's may be taken as attributable to the lightning injury.

(5) *Treatment of Lightning Stroke*.—It is important to realize that, though a patient may appear to be dead, immediate treatment may result in the resuscitation of many cases. The essential treatment is artificial respiration which should be started immediately and persisted with for hours. Artificial respiration should be begun even if the heart beat cannot be felt.

After natural respiration has returned the cases should be treated as if they were acute head injuries. Critchley (1935) advises repeated lumbar puncture as cerebral œdema is said to be present in many of these cases. The lumbar puncture in our case was not raised but, admittedly, this was not a very severe case of lightning stroke.

Critchley (1935) quotes some unorthodox methods of treating cases such as burying them in earth up to the neck, or delivering violent blows with the knee over the victim's 7th dorsal spine "to stimulate the pneumogastric nerves," which are hardly to be recommended.

(6) *Prevention of Lightning Stroke*.—Spencer (1932) makes some suggestions on this point. He points out the importance of adequate ventilation in tents in districts where lightning is common. The reason for this is that lightning often strikes down a column of hot air and he saw many examples of crowded unventilated bell tents struck during an extensive experience in South Africa. The natural tendency to shut the tent flaps tightly during a thunderstorm should if possible be avoided. The occupants of a bell tent should keep as far away from the tent pole as is practicable as the lightning flash tends to run down the pole. Spencer also cautions occupants of buildings from standing in the space between open doors and windows as he states that lightning frequently strikes horizontally through a building from door to window along a current of hot or moist air.

SUMMARY.

(1) A case of lightning stroke with transient extrapyramidal signs is described.
(2) Comments are made on the nature of lightning stroke and its clinical and pathological effects on the central nervous system.

(3) Suggestions are offered for the prevention and treatment of lightning stroke.

Our thanks are due to our Commanding Officer, Lieutenant-Colonel G. O. Chambers, M.C., for his permission to record the details of this case.

REFERENCES.

- BLAKE-PRITCHARD, E. A. (1934). *Lancet*, **1**, 1163.
CRITCHLEY, M. (1932). *Bristol Med. Chir. Jl.*, **49**, 285.
Idem. (1934). *Lancet*, **1**, 68.
Idem. (1935). *Brit. Med. Jl.*, **2**, 1217.
HASSIN, G. B. (1933). *Arch. Neurol. Psychiat.*, **30**, 1046.
SIMPSON, J. C. (1933). *Nature*, **124**, 311.
SPENCER, H. A. (1932). "Lightning, Lightning-stroke and its Treatment," London.
YOUNG, J. D. (1934-35). *New Orleans M. Jl.*, **87**, 541.

DE EXCRETICO COMBURENDO
OR AUTO-DA-FECE IN THE WESTERN COMMAND.

BY COLONEL R. A. MANSELL, *O.B.E.*

IF "Boyd's law" be bowderlized it may be accepted as a fair statement for, though provision of straw is by no means essential to the incineration of excreta, it remains true that "You can't burn faeces without fuel."

In India and other parts of the East chopped straw, or "tibbin," is the commonest and most readily available fuel for this purpose and where, as there, a section of society devotes its life and energies to this project the result can be satisfactory. But, in other countries and by other peoples not so dedicated, the use of straw as fuel for such firings is, to say the least of it, not usually satisfactory. Nor, especially in these present days of super-salvage, is it possible to provide adequate heat, either in quality or quantity, from the incineration of barrack or camp refuse. Coal is, or should nowadays be, out of court, as also is wood, apart altogether from questions of their adequacy. Coke is available and is—or may be—used in specially designed and constructed apparatus. Both this last-named fuel, however, and the proprietary apparatus in which it is unpopularly employed for this purpose, no less than the proper operation of the process, are expensive of money, material and manpower; and this operation, say what you will, does demand a considerable degree of "skill," or devotion to duty for the attainment of success—and even then it smells. There are, or have been we are told, places and occasions in which petrol has been available—or used—for this job but those are now behind us.

All that may appear to be a rather lengthy introduction to the simple statements which follow but it is always well in the discussion of any matter first to clear the air. And, be it noted, success in this particular matter is not attained unless we continue throughout the process, whatever it may be, to achieve this primary objective not only in words and ideas but also in deed and fact. No one who has lived in or near a camp whereat the methods of incineration of excreta outlined above have been practised will deny that one and all they pollute the atmosphere—to put it mildly.

We are left, then, for our fuel with oil—waste sump oil and/or, oil tanker sludge. It is, or should be, now common knowledge that this oil can be used in the oil-and-water flash fire [1] to produce a sufficiently fierce flame to incinerate the contents of latrine buckets rapidly, economically and with a minimum of labour and skill. The A.S.H. Faeces Destructor [2] is designed to ensure the complete combustion of the obnoxious fumes of the process: and it does its job—there is no doubt about that—*provided* that it is constructed and operated as originally described. This apparatus, however, suffers from at any rate two considerable and unanswerable objections. (Having been directly concerned in its original designing the writer feels fully entitled to make and uphold this statement.) One of these is permanent and inherent in the model: the other is—let us hope—temporary and it proceeds from outside causes. First: it is economical, perhaps indeed operable, only for considerable numbers of men. If we say that it is not worth contemplating the construction of this apparatus for less than 250 men we are at any rate practical. Further, to be useful, it must be in lines of reasonably permanent occupation: we have then to balance initial capital outlay on a permanent scheme against permanently recurrent, even if small, expense on the operation and maintenance of apparatus by the degree of efficiency and amenity which we are prepared, or forced, to accept. Secondly, the limitations of both supplies and labour at the present time are such that items like this, costing even less than a couple of dozen pounds, do not happen easily—let us not be accused of exaggeration.

Nevertheless the problems remain of the small camp and the temporary camp. In solution of these there is the contractor, that last resort of (let us omit the adjective)

administration—getting, and, mark you, paying—some one else to do the job : and there is the standard alternative to burning—burial. For many and obvious reasons contractors are none too often just where they are wanted ; and I suppose many of us are only now realizing how richly and deeply endowed with clay the chosen camping sites of this island are.

Nevertheless, equally, these problems cannot be, or be admitted to be, insoluble. To save ourselves time—and trouble perhaps—we have directed our thought on those two proven A.S.H. models—the Fæces and the Dressings Destructors. Let it be said at once

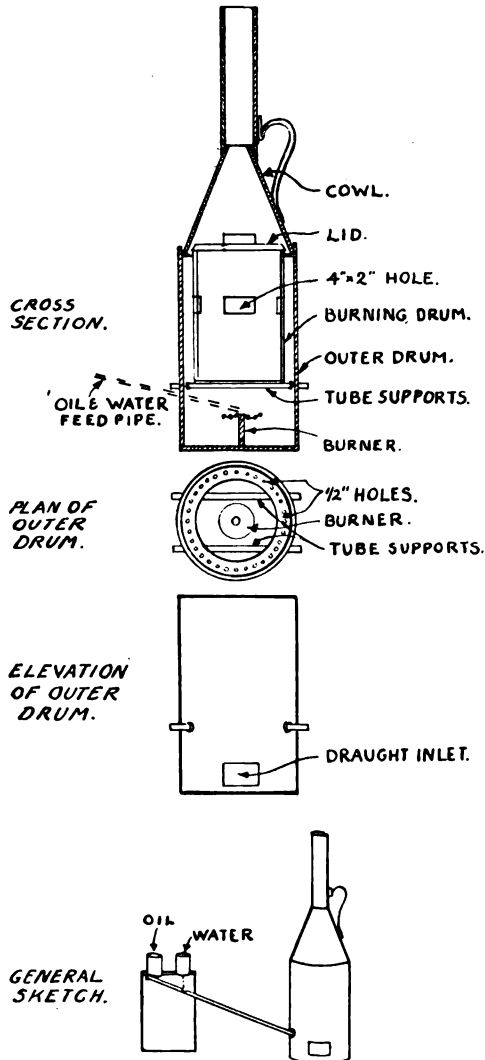


FIG. 1.—Improvised Fæces Incinerator

that variants of the former can be made in various sizes from drums and tins and scrap iron and they can be made so that they will do the job required. But, again, all that we have seen and tried suffer from two principal and important objections. Considerable metal-worker's skill is required for their construction and they smell. Here, however, is a modification of the A.S.H. Dressings Destructor [3] which is handicapped by neither of those faults and which, if made exactly as now illustrated, works exactly as described.

The materials required are :—

- 1 10-gallon metal drum.
- 3 5-gallon metal drums.
- 3 feet of $\frac{1}{2}$ inch iron bar or tube.

One of the 5-gallon drums must be capable of holding fluids though one of its ends may be damaged ; it is unimportant whether the other drums are fluid-tight or not. Even with the great care now taken of all metal containers of these types a sufficiency of damaged ones finds its way to salvage dumps, whence they may be obtained for the asking.

The 10-gallon drum forms the outer container. Its top is removed by cutting a hole therein into which a 5-gallon drum will pass easily ; this leaves a " collar " some 2 inches or less wide all round. This collar is punched with a ring of $\frac{1}{2}$ inch holes set about 1 inch apart. Some 16 inches below this collar the drum is pierced from side to side in two places to take the cut iron bar as supports for the 5-gallon inner burning drum. A short length—4 or 5 inches—of the bar or tube is fixed centrally in the bottom of this drum to support a single perforated, lipped and centrally domed flash plate on which the oil and water flash fire will be produced. A fifth hole is drilled to admit the tube leading oil and water from suitable dripping containers on to the flash plate. An oblong draught inlet is cut—4 by 3 inches—with its lower edge approximately 1 inch above the bottom of the drum. From this level air is thus principally supplied below the flash plate. It is known that there are more highly developed flash plates, or burners, for oil-and-water-flash fires and several of these were originally used. It was found, however, that the simple type depicted was not only the easiest for an unskilled man to make but was actually the most effective in apparatus constructed as now described.

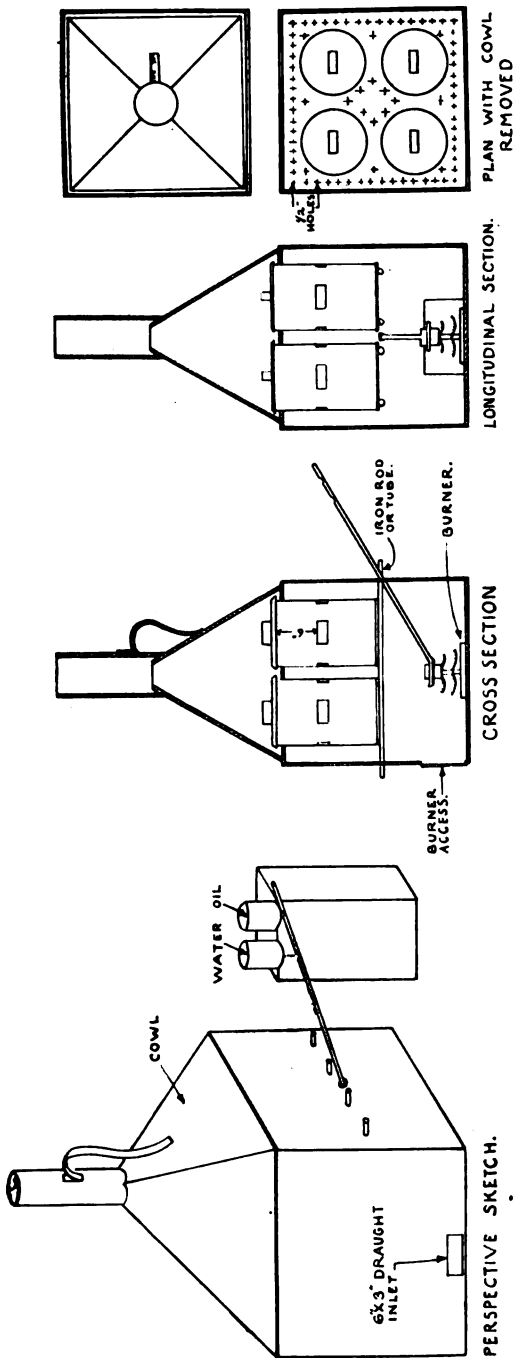
The 5-gallon drum with only one end damaged and otherwise fluid-tight has that end removed. In its sides are cut four windows, each 4 by 2 inches, with their upper edges 6 inches below the top of the drum—this positioning is important. As a refinement two small holes may be punched opposite each other near the upper open rim into which wire hooks may be inserted when it is necessary to lift this drum out of the outer container.

The two remaining 5-gallon drums are cut and fashioned to provide a lid with overlapping edge and handle for the inner burning drum and a combined cowl and chimney, with handle, for the flue.

Oil and water containers and a duct to the flash plate are set up in the usual way.

The apparatus is set up and the fire lighted. The inner drum is part filled—to within a couple of inches of the lower edges of the " windows "—with the contents of latrine buckets. As a general rule this quantity is that produced by a score of men in one day. The lid and cowl are set in place and the fire kept burning fiercely. In about twenty minutes time the apparatus is opened and the porridgy mass is well stirred with a stick or rod which is then thoroughly " flamed " in the fire before being stood in a tin of crude cresol awaiting its next use. The same operation is repeated in about another twenty minutes' time, the lid and cowl being of course replaced after each stirring. If there are more bucket contents for disposal they may be added after the second stirring and so on in sequence till the job is done. If but the one charge is to be dealt with it will be found that after a third twenty minutes' firing following the second stirring all that remains is a small quantity of completely incinerated ash. Oil consumption should not exceed, or indeed actually equal, half a gallon an hour to dispose of the latrine bucket contents from twenty men ; or, with continuous working, the produce of one hundred men is dealt with inside four hours at an expenditure of just less than two gallons of waste oil.

A further development of this apparatus has been produced by No. 7518355 Station-Sergeant J. Bent, R.A.M.C., workshop foreman of a Field Hygiene Section, who did all the work on the small model described above. This is, in fact, but a multiplication of the original designed for the destruction of the faeces of up to 400 men.



DETAIL OF BURNER.

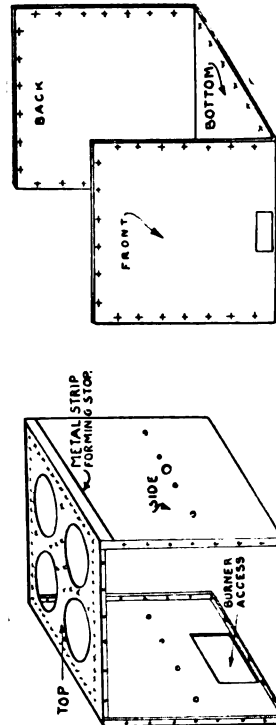
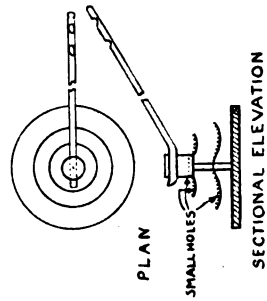


Fig. 2.—45th No. 2 Faces Incinerator for 200 Men.

The materials required are :—

3 7 feet 6 inches C.I. sheets.

4 5-gallon drums.

12 feet of $\frac{1}{2}$ inch iron bar or tube.

Details of construction are shown in the illustration from which it will be noted that an advanced stage of oil-and-water-flash burner, fitted with a pre-heater tin at the fuel delivery point as devised at the Army School of Hygiene, is employed in order to produce the maximum flame possible in quantity and quality. This type, as is clearly evident, does call for a definite degree of metal-worker's skill for its construction.

The method of operation of this model is exactly similar to that described above. A single filling comprises the latrine bucket contents from sixty men for twenty-four hours and is incinerated completely without offensive odour in an hour and a quarter at the expenditure of eight and a half pints of fuel. Continuous working will dispose of the products of 400 men in seven to eight hours for eight gallons of waste oil.

In both these models the only really "expendable" parts are the 5-gallon burning drums. Their preparation for use is not a skilled job and has, in fact, been done throughout the course of the experiments by a man previously entirely unacquainted with metal work.

References are all to the *Journal of the Royal Army Medical Corps*.

[1] Vol. 78, No. 6, June, 1942.

[2] Vol. 78, No. 5, May, 1942.

[3] Vol. 80, No. 4, April, 1943.



Editorial.

ANNUAL REPORT ON THE HEALTH OF THE ARMY IN INDIA FOR THE YEAR 1941.

THE Report opens with the serious words "The general health of the personnel of the British Army in India during 1941 has not been so good as in the immediately preceding years." This statement is substantiated by the ensuing paragraph: "For officers, compared to 1940, there has been an increase of 442·1 in the admission to hospital ratio per 1,000 and of 1·53 in the death ratio. For other ranks the admission to hospital ratio per 1,000 of strength shows, at 876·1, an increase of 152·8 compared to 1940. The average constantly sick ratio per 1,000, which is an important index of a population's healthiness, gives, at 34·62, the highest figure recorded for many years. The death ratio per 1,000 of strength, at 4·19, shows an increase of 1·42 compared with 1940." There is, however, an important reservation. "The numbers invalided per 1,000 have fallen from 6·81 in 1940 to 5·47 in 1941." The Director-General of Medical Services in India says, further, that the health of the Army in India for 1941, "while not so good as in former years, is considered to have been on the whole fairly satisfactory, taking into account the many adverse factors present throughout the year." These included (a) Inexperienced medical officers; (b) alteration of the age composition of the Army and decline in physical fitness; (c) civilian soldiers; (d) movement of troops.

To these adverse factors might be added, for British soldiers, the retention in India of many that would, undoubtedly, have been sent home if the conditions had been normal yet who remained to sicken again from recurrent or new diseases; and, for Indian troops, the return of many from overseas to bring with them not only their individual ailments but the germs which spread disease.

We consider that the optimistic remarks of the Director-General are fully justified and that the increase of disease in a country such as India during the progress of a great war is not a matter of defective hygiene but the inevitable accompaniment of war-time conditions.

Perhaps the most important in the list is the increase of malaria. Taking the *peak month* of each year and the monthly admission ratio per 1,000 for all India, British troops, the incidence of this disease rose from about 61 per 1,000 for 1937 to 96 per 1,000 for 1941. The ratios for the peak month for Indian troops rose only from about 21·1 per 1,000 for 1937 to 29·5 in 1941. This inordinate rise in British troops is, however, explicable. "By strict anti-malaria control in cantonments," says Section III, para. 63, "*which are mere islands in the midst of an infected civil population*, malaria in the Army in India had been gradually reduced . . . to a fraction of what it had formerly been . . . The years 1937 and 1938, however, represented the peak in the achievement of malaria prevention and, with the onset of the war, a sharp upward movement in the incidence of malaria began until, in 1941, rates for both British and Indian troops began to approach those obtaining fifteen years ago." In June, 1941, on the advice of the Director of the Malaria Institute of India, Colonel G. Covell, C.I.E., I.M.S., it was resolved to bring about "a radical alteration in and extension of the existing anti-malaria organization throughout cantonments in India." There were defects in personnel, equipment and stores which had to be taken into account forthwith. It was decided to enlarge the anti-malaria personnel, to add to the equipment and to continue the drive to the construction of anti-malaria works by the M.E.S. The proposed improvements are laid down in the text and amount to, approximately, Rs. 4 per soldier in India in 1941. Though these alterations are bound to lead to improvement it is pointed out that "malaria infection will still remain as intensively present as ever in the areas surrounding cantonments," that recruits will continue to arrive in training battalions already infected,

and that Indian soldiers proceeding on leave will still contract malaria in their villages. With these reservations the scheme has been accepted and should prove a great success.

" Compared to 1940 the admission ratio per 1,000 of strength for all venereal diseases has risen from 18·9 to 27·9, an increase shared by all Commands." This may be, in part, a mere disclosing of illness which was formerly concealed. There have been very great increases in the number of medical examinations since 1939—" A plethora of medical examinations : for troops about to proceed overseas, for categorization, for new arrivals in the station, &c. At all these inspections many cases of venereal disease were discovered which, in normal times, might well have escaped detection." But these would hardly account for the very considerable increase and we must fall back on the greater number of recruits from towns and upon " war psychology " for the bulk of the cases.

" Compared to 1940 the admission ratio per 1,000 for dysentery, diarrhoea, colitis and amoebic hepatitis has increased from 55·0 per 1,000 to 92·3 per 1,000." As the report says : " A large proportion of officers and men now serving with British units in India have been all their lives accustomed to modern sanitation and do not yet appreciate the care and attention which must be given to the disposal of excreta under Indian conditions." . . . " In addition military stations are crowded with Indian recruits who have come fresh from villages where sanitation is non-existent." . . . " Finally, the bulk of the population at risk, being young and newly arrived in India, were lacking in that immunity to bacillary dysentery which the seasoned resident in India normally acquires." These are reasons sufficient to account for the increase.

We note, however, that enteric fever is less rather than more in 1941 and we see the greater reason to thank Wright and Leishman for the vaccine on which they laboured in the old days of the beginning of the century.

We also note that twenty-five cases of cholera occurred among British troops during 1941. Of these four were fatal. This, with the sixty-one cases among Indian troops, was a very small number to be recorded in twelve months.

The admission ratio for tuberculosis fell, for British troops, from 2·4 to 2·2 per 1,000. Sandfly fever, however, gave an increase of 13 per 1,000, an index of badly carried-out anti-sandfly measures and a high proportion of troops unsalted during 1941.

" All water in both barracks and camps whose purity is not above suspicion is chlorinated." How much the British and other armies owe to the work of Horrocks during the last Great War !

Clinical and Other Notes.

THE USE OF ALUMINO FERRIC IN THE FIELD FOR THE TREATMENT OF WATER CONTAINING COLLOIDS.

BY MAJOR S. KNIGHT,
Royal Army Medical Corps.

COLLOIDAL impurities are often found in water from natural sources and are objectionable on account of the colour and turbidity that still persists even after filtration. The particles are ultramicroscopic in size and pass through the standard Army metal filters using filter powder (Kieselguhr) as the filter aid. Colloids can only be filtered out by a semi-permeable membrane, a process which is too slow for use in the field. The colloids must be coagulated until the particles are large enough to be precipitated or retained in the filters.

The particles have a negative charge and remain in suspension because they constantly repel one another; when subjected to an electric current they travel to the anode (cataphoresis). It is known that the addition of positively charged colloids such as the hydroxides of aluminium and iron neutralizes this negative charge. Mutual coagulation then takes place between the alumino ferric colloids and the colloids in the water. The particles no longer repel one another, they fuse and are therefore large enough to be held up by the filter bed. Precipitated aluminium hydroxide is inert in this respect; it acts only as a mechanical filter. For this reason the gelatinous film or aluminium hydroxide deposited on the cloth filters will remove coarse suspended matter but will allow colloids to pass through.

If colloids are to be coagulated it is essential, therefore, that the formation of the aluminium hydroxide should take place actually in the presence of the colloids in the water. Intimate mixing by means of a drip feed or continuous injection is required. Used in this way the dose of alumino ferric is not critical; it is not necessary for the floc to be so well formed that it will settle. Under-dosage of alumino ferric merely shows itself as a slight deterioration in the quality of the filtrate.

EXISTING METHODS OF TREATMENT.

In the field, water containing colloids can be treated with alumino ferric, using about 4 grains per gallon, and the preliminary coagulation carried out in tanks. If time permits (4 to 6 hours) complete sedimentation is allowed and the clear supernatant water then pumped through the filters. If time is short, only partial sedimentation is allowed, the floc being held back by the filters.

The Mobile Water Purifier has a dosing device known as a "Filtrader" or "Recharger." This device feeds a small amount of filter powder (Kieselguhr) to the incoming water and is used when dealing with dirty water. The process, in practice, prevents the deposition of an impervious layer of mud on the outside of the Kieselguhr bed so that the filter retains its efficiency for longer pumping periods. Colloids, however, are not removed by this process and the filtered water is still highly coloured. Pre-sedimentation, partial or complete, in 1,200 gallon tanks is necessary if a clear water is to be provided.

SUGGESTED METHODS.

In the field, extra pumps and tanks are not always readily available; moreover, a supply of clear water may be required at once.

The following methods have been developed at the Army School of Hygiene whereby crystal clear water can be obtained immediately in these circumstances from water containing large quantities of colloids.

Method 1 (Bulk Method).—Using the Mobile Water Purifier, Mk. II, the Filtraider being used as a dosing device for alumino ferric.

The Filtraider adds Kieselguhr on the suction side of the pump and sufficient alumino ferric solution is added to the Filtraider tank to dose the water with 1 to 2 grains per gallon. The churning action of the Mono pump ensures intimate mixing with the colloids of the water.

A trial was made using a particularly bad lake water (pH value 7·0). Attempts to filter out a crystal clear water without preliminary coagulation had failed, the filtrate being highly coloured. The water contained 8 parts per 100,000 suspended solids, which were removed by an asbestos filter, but the resulting filtrate was still deep chocolate brown in colour.

Purification by Mobile Water Purifier, Mk. II, with and without alumino ferric.

				Filtraider in action	
				(A)	(B)
Alumino ferric added	..	..	..	Nil	8 oz.
Quality of filtrate	..	..	..	Deep chocolate brown colour	Crystal clear
Volume of water filtered	..	..	..	2,500 gallons	2,500 gallons

The method in "B" of using alumino ferric in the Filtraider tank was as follows :—

Four ounces of alumino ferric was dissolved in about a gallon of water and added to the Filtraider tank. A further 4 ounces was dissolved in a bucket of water and added gradually as the quality of the filtrate deteriorated.

The trial was repeated using a slightly acid water (pH value 6·0). This water was obtained from a pit dug in clay subsoil and received drainage from the surrounding peaty land. The suspended solids were 8·5 parts per 100,000 but the filtrate was still highly coloured. Using the Filtraider alone, the filtrate was coloured but, when 1 to 2 grains per gallon of alumino ferric was added in the manner outlined above, an immediate improvement took place—a clear water being obtained.

It is to be noted that the first trial was carried out on a neutral water. Alkaline waters would react in a similar manner. The method was also successful in dealing with the slightly acid water in the second trial. With very acid water it may be necessary to add lime or substitute sodium aluminate for the alumino ferric.

After using the Mobile Water Purifier on twelve occasions with alumino ferric the filters were dismantled and inspected. They were clean and, on starting up, a rate of 3,000 g.p.h. was obtained. There is no evidence to suggest that the use of alumino ferric will reduce their efficiency provided that adequate backflushing is carried out.

The following instructions for the use of alumino ferric in the Filtraider tank of the Mobile Water Purifier, Mk. II, are suggested :—

- (1) Alumino ferric only to be used when the filtrate is coloured or cloudy.
- (2) Filters and Filtraider tank charged and engine started up in the normal manner.
- (3) The Filtraider put into action and pump worked slowly.
- (4) Four ounces of alumino ferric dissolved in about a gallon of water and added to Filtraider tank. After this addition the filtrate will clear immediately.
- (5) A further 4 ounces of alumino ferric are dissolved and added in small quantities as and when the quality of the filtrate begins to deteriorate.

Method II. Use of Alumino Ferric with Unit Vehicles.—Alumino ferric may be used, with unit apparatus, for the treatment of water containing colloids even though tanks are not available.

Process (A).—The most economical method, if time permits and the nature of the source is suitable, is to dig a pit 4 by 4 by 4 feet (capacity about 400 gallons) at the water's edge and connect to the source by a channel. Four ounces (one-third Black cup) of crushed alumino ferric are dissolved in a gallon of water and allowed to drip into the incoming water. A dam is placed across the channel and partial or complete sedimentation carried out before filtering by the units vehicle.

If the source is to be used on several occasions, before leaving, the pit is refilled with water and dosed with alumino ferric. This method has the great advantage that, in dealing with dirty water, the silt is precipitated in the pit rather than retained in the filters, where its presence causes frequent clogging.

Process (B).—A pit is dug at the water's edge large enough to hold a 10 pound Kieselguhr tin or a 4 gallon petrol tin. The floats and casing are removed from the suction hose and the strainers placed in the tin. Over the channel connecting the source to the pit a drip feed of alumino ferric solution is arranged. This solution is made up by dissolving about 1 ounce of alumino ferric in a gallon of water in another tin. The drip is controlled by means of a stick fitting into a nail hole. The dose is increased or decreased according to the quality of the filtrate. The life of the filter bed can be prolonged by mixing a 3 ounce charge of Kieselguhr in a jug of water which is added gradually to the water in the channel.

Process (C).—If the above methods are impracticable, clear water can be obtained by suspending the hose strainers inside a large tin into which about 20 pieces (marble size) of alumino ferric have been placed. The tin is suspended in the source and pumping commenced, more alumino ferric being added when the quality of the filtrate deteriorates.

Methods described above for using alumino ferric in the treatment of water containing colloids can be adapted for use with either the Mobile Water Purifier, Mk. II, or with unit vehicles. No extra equipment is required; alumino ferric is an R.A.S.C. supply.

This procedure will be found useful when a supply of clear water is required immediately or when tanks are not available for preliminary sedimentation.

I am indebted to Colonel E. B. Allnutt, *M.C.*, Commandant, Army School of Hygiene, for permission to submit this article for publication.

The co-operation of Quartermaster Serjeant Haynes, *R.A.M.C.*, and Serjeant Ridley, *R.A.M.C.*, has been of special value.

A MAP READING LIGHT.

BY CAPTAIN F. P. HALLSWORTH,

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THE night map reading device here described was designed to give clear illumination of a map at night, with the minimum of extraneous light, thus obviating the usual blackout difficulties and eliminating the danger of dazzling the driver when using a torch in reading a map in the car at night.

Early trials with improvised boxes proved very successful but showed that it was unsatisfactory to make the unit self contained as the "Y" type Mark II dry-battery proved too large and heavy and no smaller type of battery was found which could readily be replaced from stores in the field.

Finally it was decided to use an external Mark II carried on the web-equipment belt and,

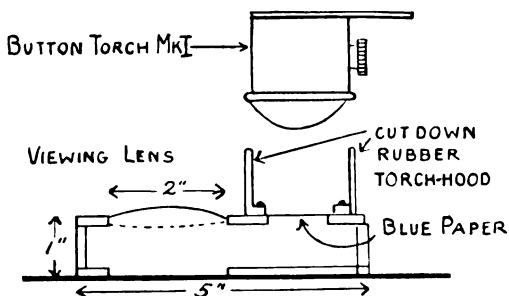


FIG. I.

as this battery already supplied the Mark I button torch, extra leads were avoided by using the torch as the source of light for the box. A coupling was fashioned from a rubber torch hood or mask which gave easy removal of the torch head when required for other purposes.

The dimensions in the accompanying diagram may be altered to suit almost any lens, the height being best decided by trial so that a satisfactory compromise is reached between magnification and clarity. A piece of blue carbon paper introduced at the base of the rubber adaptor serves to give a bluish light, which picks out the red roads on the map, intensifying their marking.

Owing to the degree of magnification introduced distance-gauging would appear to be interfered with but this is not found to be the case as the operator soon becomes accustomed to using the box which has proved to be of very great use in night convoy work.

AN EPIDEMIC OF INFECTIOUS MONONUCLEOSIS ON A TROOPSHIP.

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INFECTIOUS mononucleosis or glandular fever was so named by Sprunt and Evans [1]. It is a disease which occurs in small epidemics resembling, in the early stages, acute lymphatic leukæmia but differing in being usually of short duration and running a benign course. The disease is obviously of an infectious nature since it occurs in small epidemics. The incubation period is believed to be from seven to ten days.

The causative organism has not yet been identified however. *Listerella monocytogenes hominis* has been suspected but Wising [2] was unable to reproduce the disease in human volunteers by injecting cultures of *Listerella*. At present a virus has the strongest claim to be the infecting agent. Nettleship [3] was able to produce small white growths infiltrated with mononuclear cells on chick chorio-allantoic membranes using bacteria-free filtrates of blood and nasal washings of patients and van den Bergh and Liessens [4] reproduced the disease in monkeys by injection of these cultures.

Two clinical types of the disease are described by Box [5]. Firstly, in the anginose type occurring in children, there is a sudden onset of malaise and slight sore throat followed by enlargement of the lymph glands. The superficial glands are involved but involvement of the mediastinal glands may be shown by cough and dysphagia and of the abdominal glands by vomiting and abdominal pain. The glands may attain a considerable size and be easily palpable through the abdominal wall.

Secondly, there is the febrile type occurring in adults with pyrexia, malaise, headache and muscular pains. During the second week an erythematous or maculo-papular rash may occur and the glandular enlargement appears towards the end of the second or beginning of the third week. This glandular enlargement is never extreme.

The disease is protracted and convalescence slow.

A blood count shows a decrease in the polymorphonuclear leucocytes with a large increase in the monocytes or the presence of large atypical basophil lymphocytes with nuclei having a coarse chromatin pattern unlike the delicate structure of the nuclei of immature lymphocytes or lymphoblasts. These cells resemble in some respects monocytes and in others lymphocytes and are called aberrant cells. The red blood cells are normal. The blood film distinguishes immediately infectious mononucleosis from leukæmia, in which the cells are

more numerous and more uniform in type, and from other diseases characterized by chronic enlargement of the lymph glands.

We, on board a troopship in the tropics, had a small epidemic of infectious mononucleosis with certain distinguishing characteristics which we believe should be recorded. The disease was predominantly glandular, the patients complaining primarily of painful swellings, and was of short duration. Convalescence was also rapid. The disease resembled the type described by Pfeiffer (Tidy [6]) as occurring at times in children.

The disease appeared in four officers all of whom had been together on a course lasting one week just before coming on board. No other cases occurred that we are aware of.

On the first day two officers reported sick :—

(1) M., aged 27. Complained of headache and pain in the left groin. On examination there were enlarged, discrete, tender superficial femoral and inguinal glands. The overlying skin was normal. On the next day there was pain in the right groin and at the back of the neck with enlarged glands at these sites. The spleen was not palpable.

The white blood count showed polymorphs, 40 per cent ; lymphocytes, 42 per cent ; monocytes, 18 per cent.

Seven days later the patient felt all right although there was some enlargement of the glands. Fourteen days later the enlargement was still present, but painless, and the white blood count was : Polymorphs, 70 per cent ; lymphocytes, 24 per cent ; monocytes, 6 per cent.

(2) S., aged 22. On the first day complained of headache and general malaise. Examination revealed enlarged glands at the site. There was a temperature of 101° F. which was maintained for three days and then became normal when the patient felt well again although enlarged glands were still palpable.

The white blood count showed : Polymorphs, 57 per cent ; lymphocytes, 23 per cent ; monocytes, 20 per cent.

This film showed many aberrant cell forms.

At the end of a fortnight no glands were palpable and the white cell count showed polymorphs, 75 per cent ; lymphocytes, 19 per cent ; monocytes, 6 per cent.

No aberrant cells were present.

On the second day the remaining two officers reported sick.

(3) A., aged 37. Complained of pain in the left groin and during the next day in the right groin. Enlarged discrete inguinal glands were found on examination. Two days later there was pain at the back of the neck, headache and sore throat with a temperature of 100° F. Enlarged glands were now present in the submaxillary, inguinal, and occipital regions. The white blood count showed polymorphs, 48 per cent ; lymphocytes, 21 per cent ; monocytes, 31 per cent.

The temperature returned to normal in two days and at this time only the inguinal glands were palpable. The patient felt well.

On the eleventh day a small maculo-papular rash appeared on the chest. No malaise was present. By the fourteenth day the rash had disappeared and only a few painless glands were palpable in the right groin.

The white blood count was polymorphs, 63 per cent ; lymphocytes, 26 per cent ; monocytes, 11 per cent.

Many aberrant cells were still present.

(4) G., aged 21. Complained of pain in both groins with severe headache. Glandular enlargement was present in both groins. Two days later there was stiffness of the neck with a sore throat ; temperature 101° F. Glands enlarged in both posterior triangles. The temperature varied between 102° and 103° F. and on the fifth day a generalized erythematous rash appeared followed by a maculo-papular eruption the next day. This rash was confined to the lower extremities with a few spots on the chest. By the twelfth day the temperature had fallen to 99° F. and by the fourteenth day there was no pyrexia and no palpable glands. The rash was rapidly disappearing and the patient was fit for duty.

The white blood count showed :

First day, polymorphs, 49 per cent ; lymphocytes, 23 per cent ; monocytes, 28 per cent.

Seventh day, polymorphs, 48 per cent ; lymphocytes, 34 per cent ; monocytes, 18 per cent.

Fourteenth day, polymorphs, 63 per cent ; lymphocytes, 28 per cent ; monocytes, 9 per cent.

In all the blood counts the aberrant cells were classed according to which cell they resembled most—lymphocyte or monocyte.

CONCLUSIONS.

The main points in the diagnosis were :—

- (1) The presence of a small epidemic.
- (2) An increase in the non-granular leucocytes with the absence of primitive cells.
- (3) Normality of the red blood corpuscles.
- (4) The benign course of the disease.

The interesting points were the marked predominance of glandular symptoms in four officers who had been together on a course and the quick subsidence of the attack. Three of the four officers were back on duty within a week instead of the usual two to three weeks illness. In the fourth case the persistence of the rash was the main cause keeping the officer from duty.

The blood counts in each case were characteristic and by the end of a fortnight the counts were practically normal. The granular cells had increased and only the monocytes remained slightly above their normal level.

It must be borne in mind that malaria, a great mimic of other diseases, also gives a monocytosis of from 15 to 20 per cent in the early stages. No aberrant white cells are present however. Repeated examinations failed to show any plasmodia or granules and no anaemia was present.

Treatment consisted of rest in bed, light diet and aspirin for the pain. All were allowed up as soon as the pyrexia had subsided.

We wish to thank the S.M.O., Captain D. M. Cathie, R.A.M.C., for permission to forward the notes of these cases.

REFERENCES.

- [1] SPRUNT and EVANS. *Bull. Johns Hopkins Hosp.*, 1920, **21**, 410.
- [2] WISING. *Acta med. Scand.*, 1942, Supplement 133.
- [3] NETTLESHIP. *Proc. Soc. Exp. Biol. N.Y.*, 1942, **49**, 116.
- [4] VAN DEN BERGH and LIESSENS. *C. R. Soc. Biol. Paris*, 1939, **131**, 156, **132**, 90.
- [5] BOX. "Practice of Medicine," ed. F. W. Price, 5th ed., p. 308.
- [6] TIDY. *Lancet*, 1934, **207**, 180, 236.

THE DIAGNOSIS OF TRYPANOSOMIASIS IN WEST AFRICA.

BY CAPTAIN J. R. HOLDEN,

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TRYPANOSOMIASIS is endemic in West Africa. It is therefore not surprising that a number of African soldiers has been found to be suffering from the disease which has been contracted either before enlistment or possibly as a result of service, even though surveys carried out before the siting of camps have, as far as possible, kept troops from the more highly infected areas.

Experience has shown that the vast majority of patients with trypanosomiasis are admitted to hospital only when the central nervous system has become involved. This is largely because the early symptoms are vague and non-specific and may easily be mistaken for other conditions unless the possibility of trypanosomiasis is kept in mind. In addition, the technique of palpating and of successfully puncturing the posterior cervical lymph nodes is one which has to be carefully practised before any degree of expertness can be attained. Enlarged positive lymph nodes may thus be easily missed.

The distribution of *Trypanosoma gambiense*, which is the species of trypanosome found in West Africa, corresponds to that of the tsetse flies *Glossina palpalis*, *G. tachinoides*, and

to a less extent *G. longipalpis* and those of the *sub-morsitans* group : that is to say the valleys of the great rivers and their tributaries, the Senegal, the Gambia, the Volta, the Upper Niger and perhaps worst of all, the Congo.

Villages where, by the drying up of streams, the flies are cut off from water during the dry season tend to be the most heavily infected. This can be demonstrated very clearly on the south bank of the Gambia.

Incubation Periods.—The tsetse fly may carry infection in two ways : (1) mechanically, by biting an infected person and then immediately biting someone else ; (2) by cyclic transmission, the trypanosomes undergoing various changes in the fly which becomes infective after about three weeks.

Two to three weeks after an infecting bite trypanosomes appear in the blood ; this constitutes the first stage. In about two to three months the cervical lymph nodes start to enlarge ; this is the second stage. The central nervous system is involved in a matter of months or years.

Symptoms and Signs.—While only blood infection exists there is irregular fever—highest in the evening—and headache.

During the second stage fever may persist ; headache almost certainly will. There is enlargement of the lymph nodes—most constantly the cervical but also the axillary, inguinal and mesenteric lymph nodes. There may be local œdemas of the face, feet, testicles, scrotum or vulva. There may be impotence or amenorrhœa in females and later there may be myocarditis with cardiac failure. Some patients appear almost myxœdematous. Symptoms referable to involvement of the central nervous system are headache, this is almost always present, inability to concentrate, monotonous slurred speech with constant repetition of phrases : almost any form of peculiarity of speech or memory may be present. A trained African nursing orderly will naturally be able to detect early mental changes in another African long before a European can do so. There may or may not be fever.

Later there is drowsiness, the patient even falling asleep while feeding. There may be neck rigidity, tremor of the tongue, spasticity and tremor of the arms and legs, incontinence, coma or mania. It is in fact common for Africans who have committed acts of violence to plead that they have sleeping sickness. There is a general look of apathy or even disgust with their surroundings as if the patient had lost a shilling and picked up a bad farthing. During the cerebral stage they often develop a very irritating papular dermatitis. It must be borne in mind that functional nervous disorders may mask organic lesions.

Diagnosis.—In the first stage the diagnosis may be made by examination of (i) a wet blood film, or of (ii) a thick blood film stained directly with Giemsa or from triple centrifuged citrated blood.

In the second stage diagnosis is made by the blood examinations already cited and by lymph node puncture. As this is by far the most important test the following details are given.

Apparatus required : Size 16 hypodermic needles, sterilized and dry. Syringe—airtight and dry but not necessarily sterile. The needle and syringe must be dry or trypanosomes will absorb water by osmosis and burst. Slides, No. 1 coverslips, microscope with $\frac{1}{4}$ inch objective, spirit and swabs.

To find enlarged lymph nodes in the neck use first the flat of the hand, then pick up the skin and search for the deep nodes. Choose the softest and a deep in preference to a superficial lymph node.

For nodes on the *right* side stand in front of the patient ; for nodes on the *left* stand behind the patient. Clean the skin. Take hold of the enlarged lymph node with the thumb and first two fingers of the left hand and pull it up against the skin. Take the needle in the right hand and stick it into the node. Squeeze the node and stir the needle round. If one is not sure whether the needle is in the node release the node and move the needle ; the node should move with it. Take out the needle, pull out the plunger of the syringe, fix

on the needle and blow the juice on to the slide. Remove the piece of skin which the needle punches out or the film will be too thick ; put on the coverslip.

At least five minutes examination is required before the film can be called negative. It may be necessary to do two or three lymph node punctures before declaring the lymph node negative.

Diagnosis when the Central Nervous System is Involved.—This is done by blood examinations, lymph node puncture and lumbar puncture. It is important to remember that the infection may have died out in the blood and lymph nodes but may still be active in the central nervous system.

If an African seems ill, complains of persistent headache, has palpable lymph nodes in his neck and no clear-cut diagnosis has been made, do a lumbar puncture, even if lymph node puncture is negative and there are no obvious mental changes. If an African has any mental changes, even though he has no palpable lymph nodes or puncture of the nodes is negative, do a lumbar puncture. Any patient who has a positive blood or positive lymph node puncture should have a lumbar puncture performed to determine how far the disease has advanced.

The changes in the cerebrospinal fluid in a case where the central system is involved are as follows : Any case with more than 7 lymphocytes per c.mm. is suspicious. The count may vary from 10 to over 2,000 lymphocytes per c.mm. The globulin is raised. In a small proportion of advanced cases trypanosomes may be found in the centrifuged cerebrospinal fluid. Experience has shown that any African with a chronic illness and a cell count in the cerebrospinal fluid of 10 or more lymphocytes per c.mm. should be regarded as a case of trypanosomiasis and treated as such unless there is strong evidence that he has cerebral syphilis (as evidenced by a positive Kahn in his cerebrospinal fluid) or tuberculous meningitis. Meningo-encephalitis may be mistaken for sleeping sickness but is rarely chronic. Cerebral malaria is also acute and malarial parasites are found in the capillaries. Cerebral malaria may occur in the African but is very rare. In West African soldiers trypanosomiasis has been mistaken for acute mania, hysteria, encephalitis, glandular fever, Hodgkin's disease, tubercular lymph nodes, pulmonary tuberculosis and malaria. The rash of advanced cases has been mistaken for scabies and yaws.

FOUR ADVANCED CASES MAY BE DESCRIBED IN DETAIL.

Case 1.—Mohamodu Ceeseey, aged 28, an interpreter, stated that he had had headaches for one year, enlarged lymph nodes in the neck for three months ; an independent witness stated that the patient sometimes fell asleep while doing his work and that his interpreting was becoming unreliable. Examination showed that whilst displaying signs of intelligence he became easily muddled and inattentive. Examination of the central nervous system showed a tremor of the tongue but no other abnormalities. Blood : negative. Gland puncture : trypanosomes found. Cerebrospinal fluid : 780 cells per c.mm. lymphocytes. He received three doses of antrypol 1 gramme and five doses of tryparsamide 2 grammes at five-day intervals. The blood and lymph nodes were sterile after the second dose of antrypol ; the patient said he felt much better in himself. At the end of the course he was clinically much improved and was able to do his work properly. The cerebrospinal fluid then contained 40 cells per c.mm.

The interest in this case lies in the fact that it is usually difficult for a European to assess mental deterioration and improvement in a Gambian villager ; an interpreter provides an ideal subject.

Case 2.—Jeniba Jaju, village woman, aged 40 ; apparently incoherent, assisted to walk by two friends and unable to stand unaided. Spastic paresis of both legs and arms, tremor of tongue and of right arm ; unable to obtain any coherent history except that she had been unable to walk for three months and that her head hurt. Blood : negative. Lymph nodes : none palpable. Cerebrospinal fluid : 895 lymphocytes per c.mm. No trypanosomes seen. Diagnosis : clinical trypanosomiasis. After a course of antrypol 1 gramme, three doses, tryparsamide 2 grammes, five doses, she was able to say that she felt much better and to talk coherently on simple matters. She was able to walk without a stick,

though all four limbs were spastic ; the tremors were much reduced. Cerebrospinal fluid : 50 cells per c.mm. Prognosis : will probably relapse.

Case 3.—Musaba Sani, village woman, aged 25. Obviously in the "sleeping stage," silent, puffy face, spastic gait. Blood : negative. Lymph nodes : none palpable. Cerebrospinal fluid : 2,412 lymphocytes per c.mm. No trypanosomes seen. Diagnosis : clinical trypanosomiasis. After a course of antrypol and tryparsamide she became much brighter and was able to carry on a normal conversation ; her walk improved. Cerebrospinal fluid : 130 cells per c.mm. Prognosis : poor.

Case 4.—Awa Tamba, village woman, aged 30. My African serjeant said that she looked like a trypanosomiasis case ; I could see little abnormal except that she appeared rather sullen. Blood : negative. Lymph nodes : negative on both sides (four punctures). Cerebrospinal fluid : 137 lymphocytes per c.mm. Diagnosis : clinical trypanosomiasis. After a course of antrypol and tryparsamide her whole attitude was different, she became friendly and cheerful and, while I had not been able to see much abnormal before treatment, the improvement after treatment was obvious. Cerebrospinal fluid after treatment:—5 cells per c.mm. Prognosis : good.

The interest in the last three cases lies in the fact that they had advanced trypanosomiasis but no trypanosomes were found in blood or lymph nodes, and in two no lymph nodes were palpable. A diagnosis was made on clinical appearances, the findings in the cerebrospinal fluid and the response to treatment.

TREATMENT.

The standard course that has been used in the field in this Command consists of three or four injections of antrypol 1 gramme intravenously at five-day intervals followed by five or six injections of tryparsamide 2 grammes, two also at five-day intervals. The course therefore lasts thirty-five to forty-five days. Antrypol sterilizes the blood and glands but does not enter the central nervous system. Tryparsamide though not so trypanocidal as antrypol does enter the central nervous system. At the end of this course, depending on the clinical condition of the patient and the findings in the cerebrospinal fluid, further doses of tryparsamide may be given up to 30 grammes ; but a close watch must be kept on the fundi and visual fields for early signs of optic neuritis. The visual acuity should also be investigated and is easier to determine in illiterates and advanced cases. It is unlikely that 30 grammes will ever do more good than 20 grammes. It can certainly do more harm and complete blindness may result with permanent involvement of the central nervous system although the patient may be cured of trypanosomiasis.

Depending on clinical conditions lumbar puncture should be repeated at intervals of one month, three months, nine months and eighteen months after treatment ; often it is practicable only to do it one month and eighteen months after treatment.

The full value of pentamidine, 4 : 4' diamidino-diphenoxy pentane, has not yet been properly ascertained in infections due to *T. gambiense*. It is a somewhat alarming drug to use and may cause the blood-pressure to fall to 50 mm. Hg. within one minute of intravenous injection : on the other hand there are no records of any late toxic effects when reasonable doses are used.

It is possible to cure early cases in ten days so long as the central nervous system is *not* involved ; probably these cases are cured in five days.

Preliminary reports indicate that pentamidine is not as good as the combined antrypol and tryparsamide treatment in cases with central nervous system involvement but it is sometimes of great benefit in cases where antrypol and tryparsamide have failed, especially when the albumin is raised in the cerebrospinal fluid.

Drug Fastness to Arsenicals.—If only one or two injections of tryparsamide are given to a case of trypanosomiasis the trypanosomes may become arsenic fast. This fastness has been demonstrated to be transmissible through the tsetse fly for at least two cycles. That is to say it is theoretically possible to infect a whole area with arsenic fast trypanosomes through one patient not completing his course of treatment.

There is every reason to suppose that the indiscriminate use of neoarsphenamine and

allied drugs may have a similar effect (*cf.* Schlossberger and Schüffner 1934). Neoarsphenamine should not, therefore, be given to any African till the patient has had a thick blood film and, if he has palpable cervical lymph nodes, a node puncture has been done to exclude coexisting trypanosomiasis.

Prophylaxis.—Antrypol 1 gramme given intramuscularly or intravenously gives a degree of immunity for one and probably two months.

Prognosis.—Before the central nervous system is involved about 98 to 100 per cent can be completely cured; early cases with central nervous system involvement, about 70 per cent cured; advanced cases with central nervous system involvement, 70 per cent improved and the disease arrested in 50 per cent. Prognosis is very much worse with each relapse. It is very difficult to give an accurate prognosis in any individual advanced case. Once the trypanosome has entered the central nervous system the disease is almost always fatal if not treated.

To summarise the most important points. Trypanosomiasis is a disease which, if diagnosed before the central nervous system is involved, can almost certainly be cured. If diagnosed during the early stage of central nervous system involvement much can be done. Even in advanced cases there is hope that the patient will be able to return to some form of work and a possibility of cure.

Early diagnosis is all important and depends firstly on a good technique for *gland puncture*; secondly recognition of the need for early *lumbar puncture*; thirdly the co-operation of an intelligent African to assess the patient's mental condition.

In a recent survey in the Gambia, carried out by Captain D. McGowan and myself, the microscopical work was done by two Gold Coast Africans; the gland punctures and blood films were done by two Nigerians; the intravenous injections and the preparation of sterile distilled water by two Gambians.

The elimination of trypanosomiasis from Africa will depend ultimately on the training of African teams. The R.A.M.C. has the opportunity of training African technicians who rapidly become extremely expert and can teach the medical officer new to the tropics much that he would otherwise fail to learn even after many months.

REFERENCE.

SCHLOSSBERGER, H., and SCHÜFFNER, R. (1934). *Angew. Chem.*, **47**, 768.

THE SURGICAL ASPECTS OF MALARIA.

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WHILST malaria is rightly included in the domain of the physician there are certain aspects of the disease which merit the careful attention of the surgeons and especially those who are working in tropical and sub-tropical climes. It appears that the surgical aspects of malaria have received little attention in the English literature concerning the disease but important contributions have been made to our knowledge of the subject by certain French writers. During recent months in North Africa the writer has been able to make a special study of this subject as the result of the examination of large numbers of patients suffering from the disease and particularly of patients admitted to the Surgical Division when it was doubtful whether the patient was suffering from malaria or some condition requiring surgical attention. In addition a certain number of patients with malaria and undergoing treatment in the Medical Division developed complications demanding surgical interference. Another important group was that of patients, undergoing surgical operation or admitted for treatment of traumatic lesions, who developed malaria during hospitalization. Careful observations have been made concerning these various clinical groups and the object of this paper

is to record the details and our impressions concerning them. A study has also been undertaken of the available French literature on this important subject.

MALARIA AND TRAUMA.

It is agreed that a relationship exists between malaria and trauma. Verneuil has called attention to the following facts: (1) In cases where the patient has had malaria the injury may precipitate a recurrence of the disease. (2) Malaria may aggravate certain symptoms due to trauma such as pain and hæmorrhage. (3) If the patient lives in a malarious country trauma may be an exciting cause of malaria. The facts established by the Macedonian Campaign 1916-18 have demonstrated that malarious patients are prone to react to bodily injury in a manner which differs from the reaction of non-malarious patients.

The Influence of Trauma on Malaria.—There is incontestable evidence to prove that bodily injury may precipitate an attack of malaria in a patient who had no symptoms of the disease before the receipt of injury.

The following patients were under treatment for traumatic lesions and all developed malaria during hospitalization. They were taking mepacrine regularly and using mosquito nets every night.

Case 1.—Fracture of pelvis.

Case 2.—Contusion of thigh.

Case 3.—Fracture of metatarsals and phalanx.

Case 4.—Burns—major.

Case 5.—Burns—major.

Malaria may be a complicating factor in the management of patients suffering from battle wounds. The following case records prove that malaria may develop *de novo* or a recurrence of the disease may be precipitated.

Case 6.—G.S.W. Spine. Three weeks after wounding this patient developed clinical malaria which responded satisfactorily to therapy.

Case 7.—Shell wound back. Three weeks after wounding this patient developed malaria (B.T.), proved by blood examination. Malarial therapy was instituted with good effects.

Case 8.—G.S.W. leg and foot left with open comminuted fracture of left fibula. Four weeks after wounding the patient developed clinical malaria with a palpable spleen. Malarial therapy was instituted with good effects. This patient stated that he had developed malaria in India six years ago.

Case 9.—Shell wound knee right. Five weeks after wounding this patient developed clinical malaria which responded to therapy. He stated that he suffered from malaria (B.T.) in Egypt in October, 1942. The response to therapy was good.

Malaria may develop in the period following surgical operation. In these cases it is important to diagnose the condition in order that the appropriate treatment can be instituted. It is always wise to bear in mind that certain symptoms developing in the post-operative period, especially fever, may be due to malaria and are not the effects of the operation. The following patients developed malaria in the period following surgical operation.

Case 10.—Hæmorrhoidectomy. This patient developed malaria fifteen days following operation. He had taken one half tablet of mepacrine daily for some time.

Case 11.—Appendicectomy for acute appendicitis. This patient developed malaria six days after operation.

Case 12.—Hæmorrhoidectomy. This patient developed malaria one day after operation. He had taken mepacrine regularly.

Regarding the type of traumatic lesion which may be followed by malaria, Le Roy des Barres considers that fractures and injuries of joints are the most important and especially is this the case if the bone marrow is involved or if there is a large effusion of blood. The bone marrow, like the spleen, is a site of predilection for malarial parasites and injury may result in the setting free of parasites into the blood stream. It is possible that trauma diminishes the resistance of the patient and increases the vitality of the parasite.

If the temperature of the patient rises as the result of trauma the multiplication of malarial parasites may be favoured. It has been shown that the multiplication of *Plasmodium*

falciparum is favoured by a rise in temperature. Another theory propounded to explain the trauma-malaria syndrome is that, as a result of injury, there is an increased secretion of adrenaline which causes splenic contractions, thereby expressing malarial parasites into the general circulation.

The Influence of Malaria on Trauma.—In the French literature on the subject it is stated that the influence of malaria on traumatic lesions is considerable. In the first instance the bodily resistance to infection is decreased and consequently secondary infective lesions may develop. A marked secondary anæmia accompanies malaria which is an adverse general factor in the response of the body to injury. Changes also occur in other vital or important organs such as the liver, spleen, suprarenals and bone-marrow. The behaviour of the injured part may be modified. Thus it is said that cicatrization and healing of wounds is retarded and the consolidation of fractures is delayed. Attention has been drawn to the possibility of hæmorrhage occurring, either primary, reactionary or secondary. This phenomenon may be due to impaired liver function occurring in malarious patients.

MANIFESTATIONS OF MALARIA OF SURGICAL IMPORTANCE.

Abdominal Syndromes.—Frequently the early symptoms of malaria are abdominal in character and it is important to recognize their true significance in order that surgical operation is not undertaken with the belief that the patient is suffering from a surgical condition. These peritoneal manifestations of the disease are seen in persons living in areas where the disease is endemic in character and also in those who have left such areas. Attention is drawn to symptoms which are referable to the abdomen.

Pain : Abdominal pain commences suddenly and is very sharp in character. The patient may be able to indicate certain regions in which the pain is of maximum intensity, such as the iliac fossæ or the epigastrium, but usually the pain is somewhat difficult to localize accurately. It occurs in sharp paroxysms with remissions. The character of the pain may be that of abdominal colic—alimentary, renal or tubal. On abdominal palpation there is often generalized tenderness but in some cases it is limited to one region such as the right iliac fossa, epigastrium or umbilical area ; either para- or sub-umbilical. Superficial palpation is more tender than deep palpation. This latter sign is an important differentiating feature between malaria and acute intraperitoneal inflammation.

Rigidity : Usually there is muscle-guarding ; rigidity is not always absolute and it may vary during the examination. In some cases it is board-like in character. It may be generalized with predominance on one side with a maximum corresponding to site of tenderness such as epigastric, iliac fossæ or right hypochondrium.

Other Signs.—Distension due to meteorism is commonly seen. A peritoneal exudate may be present. Splenomegaly is frequent although the spleen is not very large except in long-standing cases.

General Features.—For several hours the patient may be somewhat prostrated ; the face is pale, lips cyanosed and the nose has a pinched appearance. In severe cases the patient is excited and in a state of agitation. There is usually fever, which sometimes reaches 40° C., but there are forms of the disease in which the temperature is low as seen in the graver forms of acute diffuse peritonitis. The pulse-rate varies ; if the temperature is not markedly elevated it is 80-90 per minute ; in other cases it varies from 120 to 150 per minute. The tension of the pulse is usually full. The tongue is dry and furred. There may be absolute constipation for fæces and flatus ; on the other hand diarrhœa is often present or the stools may be normal. Melæna has been observed. The urine is dark and scanty ; hæmaturia and also hæmoglobinuria have been noted.

There are three abdominal syndromes to which attention is called with a symptomatology referable to three regions of the abdomen.

(1) Gastro-duodenal syndrome. The symptomatology in this type of case may simulate perforation in a peptic ulcer.

(2) Hepatic syndrome. Care must be taken to differentiate between malaria and acute infection in the gall-bladder.

(3) Appendicular syndrome. In this type of case it may be difficult to differentiate between malaria and acute appendicitis.

In the differential diagnosis of malaria and acute intraperitoneal inflammatory lesions the following are helpful features. In malaria the facies is that of a general systemic infection; there is an appearance of fatigue and the colour may be earthy and sometimes there is marked pallor. Cyanosis may be present. The fever present is intermittent. The spontaneous abdominal pain is of a more diffused character than in acute diffuse peritonitis. There is marked tenderness on superficial palpation and deep palpation is well tolerated. General symptoms such as headache, backache and rigors are also helpful distinguishing features. Examination of the blood for malarial parasites and for evidence of secondary anæmia should be carried out.

Co-existing Lesions.—Emphasis is laid on the careful elucidation of all the available clinical evidence of patients living in countries where malaria is endemic who present themselves with symptoms referable to the abdomen. It is dangerous to conclude that, since malaria is established, an acute intraperitoneal lesion is absent. The writer has recently operated on two patients with proved malaria who were also suffering from acute appendicitis, gangrenous in one patient and catarrhal in the other. Several authors have considered the relationship between malaria and acute appendicitis. In malaria congestion of the large bowel and the appendix may predispose to infection in the latter organ.

Spontaneous Rupture of Spleen in Malaria.—This surgical complication of malaria is undoubtedly rare. A review of Continental literature has revealed the record of only two cases, described by Jacobi and Herlholz, in which spontaneous rupture occurred after malarial therapy. The following are the clinical details of a patient who was under the care of the writer.

Case 13.—Male, aged 35, transferred to the Surgical from the Medical Division, to which he had been admitted. For four days he had felt unwell and feverish. Abdominal pain was sharp and generalized. Later he developed diarrhœa with six bowel actions a day. There were generalized aching pains and vomiting occurred. After admission to hospital vomiting was incessant and he developed marked pain in the left hypochondrium, with referred pain to infra-clavicular regions, which was more marked on the left than right. The pain in the abdomen was exacerbated by movements. There was some restlessness. *Past history:* No evidence of recent injury. On examination the patient looked ill, temperature 103° F., and accelerated pulse-rate. The abdomen was distended, there was marked generalized tenderness and rigidity and shifting dullness in the right loin. The liver, kidneys and spleen were not felt. Rectal examination revealed marked tenderness on the right side. *Operation:* Exploratory laparotomy. A large hæmoperitoneum—1½ pints—composed of old and recent blood, was discovered. There was a subcapsular splenic hæmotoma. The spleen was double its normal size and a superficial rupture 6 cm. long was present in the diaphragmatic surface. The general condition of the patient was poor and did not warrant splenectomy so the space between the diaphragmatic surface of the spleen and the diaphragm was firmly packed with gauze. Blood transfusion was carried out during and after operation, three pints being given, and followed by continuous glucose-saline infusion. Intravenous quinine therapy was instituted and the patient improved during nine days following operation. The abdominal pack was removed two days after operation and no further intraperitoneal hæmorrhage occurred. Ten days after operation his general condition became rapidly worse and he died. Autopsy revealed bronchopneumonia and films from the spleen showed numerous malarial parasites of benign tertian type.

There are three signs in connection with rupture of the spleen to which attention is called. *Ballance's sign*—There is fixed dullness in the left flank due to a collection of coagulated blood. *Kehr's sign*—There is pain in the region of the left shoulder. Thirdly, marked pain is produced by pressure on the left phrenic nerve in the neck between the sterno-mastoid and the scalanus anticus; this is due to the fact that sensory nerves pass to the splenic capsule from the left phrenic nerve.

Malarial Cases of Surgical Interest.—The following case histories are cited concerning patients who were admitted to surgical wards as it was thought they were suffering from surgical lesions. The symptomatology was carefully considered and subsequent examination of the blood for malarial parasites confirmed that the patients were suffering from malaria.

Case 14.—Patient, aged 26, admitted with the history that to-day he had experienced sudden pain in the left side of the abdomen and he had vomited once. There were dizziness, faintness and headaches—frontal and occipital. Bowels open, no diarrhœa. There was pain in the testicles. No shivering. *Past history:* Appendicectomy, aged 9. *On examination:* T. 101.4° F.; P. 104; R. 28. Looks ill. Tongue furred. Abdomen—tenderness in left half and left loin. No rigidity. Appendicectomy scar, present. Liver, kidneys and spleen not felt. No abnormal swelling felt. No distension. No visible peristalsis. On rectal examination there was some ballooning of the rectum and no other abnormality. Blood examination positive for malarial parasites. The patient was transferred to the Medical Division.

Case 15.—Patient, aged 32, admitted with the history of backache, headache and stiffness of the neck which occurred one day ago. No other symptoms. *Past history:* Two and a half weeks previously he had been a patient in another hospital for excision of the right submaxillary salivary gland for calculus. *On examination:* T. 101° F. Patient is pale. Neck—scar in right submaxillary region is healed. Small lymph nodes in posterior triangle. *Abdomen:* no abnormality; spleen not felt. *Blood count:* R.B.C. 4,700,000 per c.c. W.B.C. 7,000 per cc. H.B. 94 per cent. *Blood examination* for malarial parasites—positive—benign tertian in type. Patient was transferred to Medical Division for treatment.

Case 16.—Patient admitted with the history of a fall from a height of ten feet. He subsequently developed headache. On examination there were no physical signs and X-ray examination of the skull revealed no fracture. The headache persisted and examination of the blood for malarial parasites was positive. He was transferred to the Medical Division for treatment.

CONCLUSIONS.

A study is presented of the surgical aspects of malaria. The relationship of trauma and malaria is discussed and illustrated by reference to case histories of patients. Attention is called to the manifestations of malaria of surgical importance and in particular to certain abdominal syndromes which occur. A case of spontaneous rupture of the spleen is described, together with other malarial cases of surgical interest.

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(2) The first aid treatment of the more serious injuries, and the methods of splintage for their transport to hospital, should be described.

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Judged by these standards Mr. Geckeler's book fails in some important respects. Too much space is allotted to a rather cursory description of advanced procedures which are really outside the proper scope of the book but diagnosis and the fundamental principles of treatment do not receive sufficient attention.

A few points may be mentioned for detailed criticism. The technique of skeletal traction, a method which in any case should never be used by the general practitioner, is described with hardly any mention of the dangers of overtraction, although this is one of the most potent causes of non-union. The Thomas' knee splint is disposed of in less than one page, with an illustration which omits several important details but includes a clove hitch applied *unpadded* over a shoe. The functional positions, which are the basis of successful splintage, especially in the hand and foot, are not clearly described; for instance, Mr. Geckeler would have done well to repeat to the point of tedium that the hand must be immobilized in the grasping position, with the fingers moderately flexed and with the thumb opposed in front of the other metacarpals and that the foot must be immobilized at a right angle with the leg in slight valgus and never in equinus and varus.

The illustrations are numerous and technically excellent.

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Notices.

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THE ROYAL INSTITUTE OF PUBLIC HEALTH & HYGIENE.

SERIES of lectures on "The Public Health," Spring Session, 1944, to be delivered in the Lecture Hall of the Institute, 28, Portland Place, W.1.

<i>Date.</i> 1944.	<i>Subject.</i>	<i>Lecturer.</i>	<i>Chairman.</i>
March 1, at 3.30 p.m.	" Ophthalmology " ..	Frank W. Law, M.A., M.D., F.R.C.S.	D. M. Connan, M.D., B.S., D.P.H.
March 8, at 3.30 p.m.	" Venereal Diseases " ..	A. H. Harkness, M.R.C.S., L.R.C.P.	W. E. Tanner, M.S., F.R.C.S.
March 15, at 3.30 p.m.	" Certain Aspects of Disease in Children " ..	Wilfred Pearson, D.S.O., M.C., M.A., M.D., F.R.C.P.	T. Jenner Hoskin, M.A., M.D., F.R.C.P.
March 22, at 3.30 p.m.	" Rehabilitation " ..	H. E. Griffiths, M.S., F.R.C.S.	Percival P. Cole, M.B., Ch.B., F.R.C.S.
March 29, at 3.30 p.m.	" Diet as it concerns the Teeth and Gums " ..	Prof. Evelyn Sprawson, M.C., D.Sc., L.R.C.P., M.R.C.S., L.D.S. R.C.S.	J. Browning Alexander, M.D., F.R.C.P.

A number of seats is reserved for Fellows, Members and Associates of the Institute, but accommodation is provided for others who are interested in health problems.

The Museum of Hygiene may be viewed before or after the Lectures.

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H. H. GERRANS,
Secretary.

THE ROYAL SANITARY INSTITUTE.

LONDON SESSIONAL MEETINGS.

A. March 1, 1944, at 2.30 p.m. Paper on "Indigenous Malaria and Mosquito Control in England After the War," by P. G. Shute, F.R.E.S., Malaria Officer, Ministry of Health. Chairman: Dr. W. A. Bullough (Member of Council).

B. March 15, 1944, at 2.30 p.m. Discussion on "Current Questions of Milk Supply," to be opened by Sir William Savage, B.Sc., M.D. Chairman: Dr. Thomas Orr (Vice-President).

C. March 28, 1944, at 2.30 p.m. Paper on "Rational Design of House Plumbing," by A. Longworth, F.R.San.I. Chairman: J. E. Swindlehurst, M.A., M.Inst.C.E. (Chairman of Council).

NOTIFICATION OF ACCEPTANCE.—Members and others proposing to attend these Meetings are requested to notify the Secretary of the Institute not later than one week before the date of the meeting in question.

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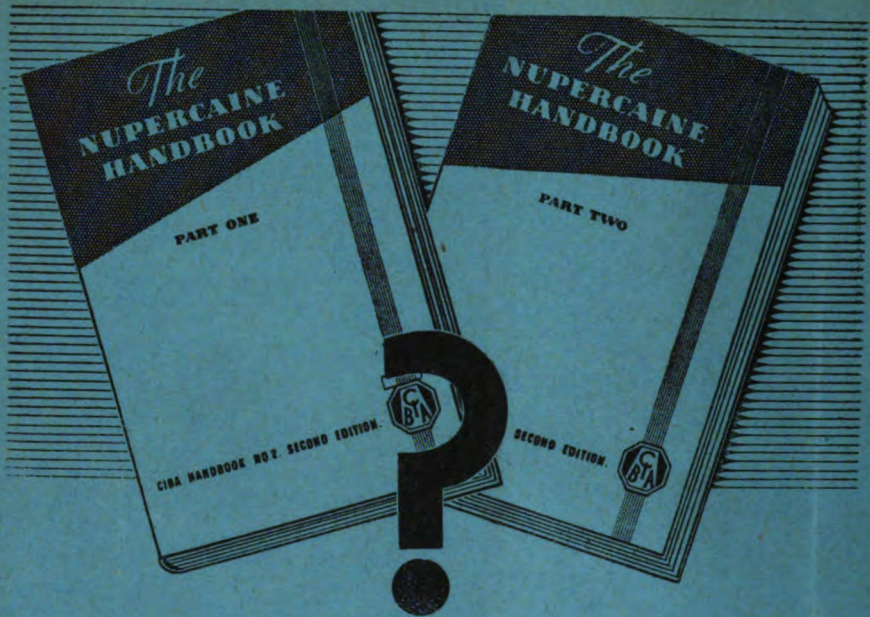
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No. 3.

March, 1944.

Vol. LXXXII.

Journal

OF

THE

Royal Army Medical Corps

ISSUED



MONTHLY

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Journal of the Royal Army Medical Corps.

Original Communications.

THE MEDICAL ASPECTS OF THE OCCUPATION OF CAPTURED ENEMY TOWNS AND PORTS.

BY COLONEL W. L. SPENCER-COX, M.C.

- I.—GENERAL.
- II.—STAFF, ESTABLISHMENTS AND MEDICAL PARTIES.
- III.—MEDICAL REQUIREMENTS.
- IV.—THE ENTRY INTO THE TOWN.
- V.—THE IMMEDIATE RECONNAISSANCE.
- VI.—THE HYGIENE ASPECT.
- VII.—SUBSEQUENT ACTION.
- VIII.—THE HAND OVER.
- IX.—ACKNOWLEDGMENT.

I.—GENERAL.

THESE remarks are confined to an account of the work of a Mobile Army Area H.Q. which moves closely behind the fighting troops and is composed of a staff of experts ready to open up captured Towns and Ports, and to establish Army Roadheads and Railheads.

The conclusions arrived at are based on personal experience gained at all towns occupied by the Eighth Army to date, i.e. Tobruk, Tripoli, Medenine, Gabes, Sfax, Syracuse, Catania, Messina, Reggio di Calabria, Crotone, Bari.

The function of the H.Q., in brief, is to enter a town immediately behind the fighting troops and take control. Law and order are established and looting stopped. Essential services—Water and Light—are put into operation. The Docks are surveyed, assessed and made to work. Rail and road communications are restored. Roadheads or Railheads are established.

From the Medical aspect, hospitals, both Military and Civil, are required—a large Medical Area must be organized and, equally important, the sanitary services must be put into operation again and the hygiene of the town controlled.

Having completed these functions, the Mobile Area hands over to a Static Sub-Area and moves ahead to repeat programme elsewhere.

II.—STAFF AND ESTABLISHMENT.

A.—*The Mobile Area H.Q.* is commanded by a Brigadier and composed of the normal Staff Branches, i.e. G., A/Q., S. and T., Medical, O.S. and Camp Commandant's establishment. Mov. and Tn. are separate but working alongside the Area H.Q.

B.—*The Area Medical Establishment* is as follows :—

A.D.M.S. ; D.A.D.H. ; E.M.O. (also acting as D.A.D.M.S.) ; Pool M.O.s 2 ; Clerks, R.A.M.C., 1 Sgt., 1 Cpl., 1 L/Cpl., 3 Ptes. ; Medical Orderlies for Pool M.O.s 2 (Other Arms).

This staff, though occasionally stretched to capacity, is normally sufficient. Their duties are self-evident except the Pool M.O.s who are required for establishing M.I. Rooms at any of the following :—

Central M.I. Room—for troops in town without M.O.s and for the Area H.Q. Staff itself.

Docks' M.I. Room—for dealing with casualties on the docks and the sick of Pioneer and Labour Coys.

Roadhead M.I. Room—when roadhead is at some distance and no other M.O.s are available.

Other M.I. Rooms—for odd units who either have no M.O. or appear in the area having lost their own.

In practice, it is found that all these will not be required at the same time and the 2 M.O.s normally suffice.

No mention has been made here of the staffing of P.A.C.s for the reason that none was available.

It is, however, quite essential that personnel for two P.A.C.s should be provided to enable them to open up early when the greatest danger of V.D. is present.

C.—*Certain other parties* need to be described.

(i) The "GOLDEN LIST" is the reconnaissance party which proceeds on the heels of the fighting troops and enters the town immediately on the day of capture. It normally consists of the Heads of Services, i.e. :—

The Commander	—	Driver and Batman.
A/Q.	—	Driver and Batman, 1 of 2 Clerks and Interpreter.
G.II.	—	Driver and Batman, Clerk, Interpreter.
A.D.S.T.	—	Driver and Batman, Clerk, Interpreter.
A.D.M.S.	—	Driver and Batman, Clerk, Interpreter.
D.A.D.H.	—	Driver and Batman, Clerk.
D.A.D.O.S.	—	Driver and Batman, Clerk.

A representative of the Camp Commandant's Staff.

This party is fully mobile and is liable to the same hazards as the fighting troops during its progress.

(ii) *The Main Body* is self-evident and consists of the remaining Staff Officers and their clerks and the Camp Commandant's department.

(iii) *The Rear Party*.—This may not always be required but, if it is, will consist of such officers as have to be temporarily left in the last station to complete the hand over or to control some essential work.

D.—*Medical Units*.

In addition to the H.Q. staff itself there are certain essential Medical Units which should be under the Command of the Area H.Q. and ready to move when ordered.

There should be :—

One Fd. Amb. or, if this cannot be spared immediately, one Coy. of a Fd. Amb. of which one section is ready on wheels to move in directly behind the "GOLDEN LIST."

One Fd. Hyg. Sect., of which 5 O.R.s should be attached to the Section Fd. Amb. for the move.

Four M.A.C. Cars. These again proceed with the section of the Fd. Amb.

Other Medical Units and the method of calling them forward are described later.

III.—MEDICAL REQUIREMENTS.

A.—Medical Units.

(i) Previous to the move into the town : a Conference will have been held by D.D.M.S., ARMY, with the D.D.M.S. of the CORPS which is making the advance and A.D.M.S. of the Mobile Area. D.D.M.S., ARMY, will have stated his plan and given a general indication of what Medical Units are available and what may be called up later. This plan is liable to be varied later, on instructions from G.H.Q., as a result of their final policy regarding the Area. It may be assumed that some or all of the following will be called up in due course :—

(ii) From Army Sources.—One Army Fd. Amb. (the one already referred to as u/c Mobile Area) ; one Army Fd. Hyg. Sect. (the one already referred to as u/c Mobile Area) ; a second Fd. Hyg. Sect. (very frequently) ; one or more C.C.S.s ; Adv. Depot Medical Stores ; One M.A.C. ; a Bact. Lab. ; a Hygiene Lab. ; an Adv. Blood Dump and F.T.U. ; one or more Fd. Surg. Units ; a Neuro-Surg. Unit ; a Facio-Max. Unit ; a Mobile Dental Unit.

(iii) From G.H.Q.—A number of General Hospitals—these may be 200, 600 or 1,200 bedded, according to the size of the Area.

At Tripoli for instance, there were : One 1,200 bedded G.H. ; one 600 bedded G.H. ; one Combined Indian G.H. ; one American Fd. Hospital (later).

At Catania : One 600 bedded G.H. ; one 600 Canadian G.H. ; one 200 G.H. (later).

Convalescent Depots may also be included in the programme.

(iv) It is important to get the General Hospital picture as early as possible because a certain amount of R.E. work will always be required. In this connexion it should be remembered that the first priority of R.E. work must always be the Docks and secondly that during rapid advances the Hospital Area may only be in use for some weeks and will then die. It is neither economical nor justifiable, therefore, to ask for more than minimum essential work UNLESS it has been clearly stated by G.H.Q. that the Area will become a more or less permanent base, as at Tripoli and Catania.

B.—The Medical Lay Out.

This will vary according to the scene of operations, i.e. Desert (or country) or Town but, in either case, the same general principle will apply and the following will be required :—

(i) *A General Medical Area.*—This should provide buildings or tents to accommodate the Fd. Amb., the C.C.S. (or C.C.S. Group as the case may be), or General Hospitals and the Laboratories, while sufficient space should be available for the parking of Ambulance Cars.

Should the Area be really great, as in the Desert where space was no object at all, ALL Medical Units, including those mentioned below, will be grouped in the same Medical Area, the only proviso being very wide dispersal for protection against bombing.

(ii) *A Medical Stores Area.*—This should consist of a large building with a good approach and will accommodate an Adv. Depot Medical Stores—Red Cross Stores—Stretcher and Blanket Dump—Blood Stores and very frequently the Fd. Hygiene Sect. or its workshops.

(iii) *A M.A.C. Area.*—The ideal situation is near the M.A.C. Check Post but, generally, there is very little choice and the only suitable place must be taken. It is essential that good Standing should be found for the M.A.C. Workshops. An abandoned and partially bombed barracks makes an ideal site.

(iv) *A Large Open Area* for a Tented Unit or Gen. Hosp.

This is generally desirable as a second string or in case the existing Medical Area is bombed out. Often it is not used at all but it is extremely wise to earmark it. There should be at least 2 kilometres of road frontage.

(v) *A Medical Transit Area.*—A very large number of Medical Units will pass through the Area, either relieving existing units or staging on their way through or temporarily held waiting disposal.

It is neither fair, nor desirable, to dump all these on the Medical Area ; the ideal is a controlled site, in or near one of those mentioned above.

(vi) *A Site of a Convalescent Depot.*—Should the locality be of a more permanent nature a Convalescent Depot will certainly be required, in addition to which a Convalescent Home for Officers is a justifiable luxury. The site of the former should always be on, or very near, the sea coast while the latter must depend upon the availability of a suitable house and grounds.

(vii) *General.*—It must be clearly stated here that there are very many claimants on buildings and space. All branches of the Staff need large areas and, although medical demands are generally agreed to, they must be fair.

All Hospitals, Sanatoria, Clinics, etc., are a Medical prerogative but schools, barracks, warehouses, etc., can only be taken by general agreement.

This stresses again the importance of the Immediate Reconnaissance.

Normally, buildings to be reserved are notified to the Town Major and Space (land) to "G."

In cases of doubt or argument, the Commander's ruling will, of course, be final.

C.—The Air Situation.

(i) It is convenient here to make some remarks on the Air Situation.

A reconnaissance must be made of the various Airfields and the following should be contacted in person or by 'phone :—

(1) P.M.O. or S.M.O., D.A.F. (in the case of the Eighth Army) ; (2) S.M.O. of any Wing in the Area ; (3) O.C. of the nearest M.F.H. (R.A.F.) ; and from them should be ascertained which airfield will be used by the R.A.F. administrative units, i.e. the A.D.R.U., the Communication Unit, the M.U., A.S.P., etc., because it is from this L.G. that empty cargo planes will be returning to Base and to this one that Aircraft of the Air Ambulance Unit can be called.

(ii) It is essential, having obtained this information, to place an Air Evacuation Section (one Section of a Fd. Amb. trained in these duties) on the Airfield as early as possible.

The principal means of evacuation is by the returning cargo planes whose capacity is large ; D.C.3s, for instance can take 18, while the Air Ambulance planes, which are better suited for serious cases, can only take 8 lying and 2 sitting.

Further, the number of cargo planes in the early stages is also great—and as many as 250 cases a day have been evacuated by this means.

(iii) Once the Air situation has been put on a firm basis, as the result of mutual agreement between P.M.O., D.A.F., and D.D.M.S., ARMY, and the normal set-up is well understood, too much emphasis CANNOT be put on the importance of using Air to the maximum. Its advantages over the slow and often cumbersome method of calling up H/Ships which, in any case, can only take 250 to 350 cases, and the saving of wear and tear on ambulance cars, are too obvious for further mention.

It must be borne in mind, however, that during *rush* periods ALL available means of evacuation will be required at the same time AND working to full capacity.

D.—Preliminary Planning.

During the period of waiting, or during the approach move itself, the immediate plan of action on arrival is decided upon.

After a close study of all maps and town plans and Intelligence Reports (if any) it is decided that certain buildings of a certain area appear the most suitable for medical requirements, the guiding factors being the distance from the Docks (not less than 2 miles if possible) and the proximity of barracks, stores and dumps which might be considered likely bomb targets.

These areas are marked on the town plan in order of priority and the roads leading to them carefully studied.

The most suitable are normally existing hospitals, private clinics, schools, university buildings, barracks, Fascist Clubs and Institutes and hotels.

In addition, the site of the large Open Area previously referred to must be provisionally chosen from the maps and then explored on the ground.

IV.—THE ENTRY INTO THE TOWN.

A.—*The Approach Move.*

This varies very considerably according to the country and the length of the move.

(i) *In the Desert.*—The distances were extremely great and the "GOLDEN LIST" party, who were fully mobile, moved about the level of REAR CORPS H.Q. At times, when urgency for quick entry was great, as at Tripoli, they moved forward to the level of REAR DIV. H.Q., and leaguered in their axis. Frequently there was a pause during the final assault on the town and during this period the "GOLDEN LIST" lay as close to the actual battle as possible ready to move instantly the road was clear. The necessity for concealment from the air was often a limiting factor.

(ii) *In Europe.*—The same principles applied except that, distances being small, the approach move was a trivial affair. In this case the "GOLDEN LIST" was on wheels and held at two or four hours' notice to move from its last station.

(iii) *The Advance Medical Units.*—These units, referred to in II, A, were in a similar state of readiness and were ordered to move about four hours after the "GOLDEN LIST."

(iv) The remainder of the H.Q. Staff and the balance of Medical Units varied in the time of their move. This might either be: (a) When called forward by the Commander, having made the immediate reconnaissance of the town and decided their location; (b) on the following day according to the block timing given by Movements; or (c), in the case of long desert moves, at the earliest date at which the heavier transport could arrive, allowing for mines, diversions, blown roads, soft sand, etc. This period might extend to three or four days.

B.—*The Entry.*

(i) The "GOLDEN LIST," having received the order to move, proceeded independently, as hard as the road or track would allow, to the rendezvous in the town previously decided by the Commander.

(ii) *A Firm Base.*—A firm Base, in the form of the actual selected office building or one to act as a report centre, was the first essential. This was decided upon by the Commander. A/Q and notice boards and signs erected leading to it. As the "GOLDEN LIST" party arrived, the clerk from each branch was dropped and acted as report centre and general contact for the department concerned.

(iii) *The State of the Town.*—During the drive in it was important to note the general state of the town, i.e. blown roads and bridges—bombed buildings—evidence of looting—burning dumps—leaking water mains—accumulation of filth and rubbish, etc.—as a first impression and guide as to what action would be required later.

(iv) *The State of the People.*—In the same way, the first reactions of the people were important—friendly or hostile—sullen or cowed. The native population particularly had to be observed, as they were the first to get out of hand, riot or loot, during the interim period between the evacuation by the main hostile force and the entry of our own.

Evidence of large numbers of people leading a semi-troglodite existence in shelters, caves, etc., should be noted as these places were always in a foul sanitary condition, particularly at Syracuse and Catania.

V.—THE IMMEDIATE RECONNAISSANCE.

A.—Having established a firm base and report centre, A.D.M.S., D.A.D.H. and the Interpreter load on to one truck and commence the first reconnaissance.

B.—*Authorities to be Consulted.*—The Podesta (Mayor) to be found at the Municipio (Town Hall). The Ufficiale Sanitario (M.O.H.) at the Municipio (Town Hall). The Commissario (Head of Police), the Questura (Police Station). The Medico Principale or Direttore (Chief Doctor), (The Principal Hospital).

The most important person from the medical point of view is generally the latter—the Ufficiale Sanitario, though in possession of sanitary (Igienico) data, is a somewhat subordinate person.

When it comes to getting things done, providing street cleaners, laying on labour, etc., the Podesta is the authority.

C.—The sites and areas already noted were visited in order of priority as quickly as possible. The visit was extremely brief and in each case the following points or a variation of them were quickly noted ;—

- (1) State of the building—bombed or usable.
- (2) Occupied—staff—equipment—medical stores—or vacant.
- (3) Services—water—light—sanitation.
- (4) Capacity—beds—stretchers—normal—emergency—expansion.
- (5) Means of approach—roads—tracks. Can a bulldozer open up sufficiently to allow entrance of lorries and ambulance cars ?
- (6) Open ground or " space," in or around, to allow for vehicles—cooking—ablution—dumps and stores.
- (7) A large clean open area—orchard or grove—a good site for a tented unit.

It must be borne in mind that accommodation will be required early for some of the following :—

(i) Fd. Amb., (ii) C.C.S., (iii) Adv. Depot Medical Stores, (iv) Hyg. Section, (v) Laboratories, (vi) M.A.C., (vii) Large Central M.I. Room, (viii) Transit Area for incoming units and, later, for those mentioned in para. IIIA.

D.—As the result of considerable experience it was possible to assess buildings and areas in an extremely short time.

If buildings were occupied the occupants were warned that a military unit might be coming in and, if so, they would either have to turn out or double themselves up into a limited space as the case might be.

It must be very clearly stated here that the greatest firmness compatible with justice is required. The Italian, particularly, will always wriggle, complain and moan but, once he is told, in no uncertain terms, exactly what he WILL do, he gets on with it without further ado. If any weakness is shown, however, there will be endless complications and delays—the Spanish " mañana " is nothing to the Italian " domani."

E.—The searching out and safeguarding of medical stores and valuable hospital equipment, including beds, mattresses, linen and hospital furniture, is an extremely important point to be borne in mind though often this cannot be accomplished during the Immediate Reconnaissance. Information regarding dumps of medical stores will often be received from other branches of the Staff during the course of their own reconnaissance. It is, however, quite essential that guards in some form or another should be placed on them immediately to prevent looting by Arabs or the local people themselves.

During the period covered by this article, medical stores valued in the neighbourhood of a quarter of a million pounds were discovered and brought into use.

F.—On completion of the Immediate Reconnaissance, A.D.M.S. and D.A.D.H. return to the office and sift the information received, discuss the merits of the various buildings and sites and decide upon those to be occupied at once.

Instructions are left with the clerk on duty for the information of incoming units.

Usually about 6 p.m. that day, and on the following days, there is an Area Conference at which the Commander explains the general plan and Heads of Services report on their findings to date.

(To be continued.)

AN ANALYSIS OF 422 CASES OF INFECTION OF THE THROAT AND GUMS.

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INTRODUCTION.

THIS paper is an account of experiences in a Military Hospital in wards set aside for the admission and treatment of cases of acute and subacute infection of the throat and gums. The period covered is from January, 1941, to May, 1943, twenty-nine months. During that period 422 cases were treated. The admissions per month are given in Table I and shown graphically in the Chart.

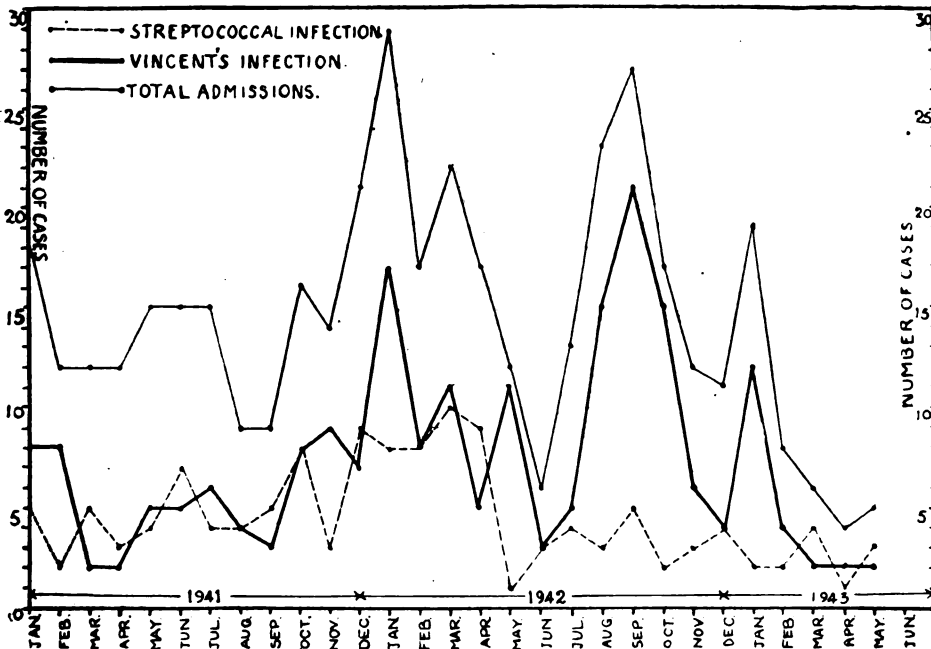
TABLE I.—MONTHLY INCIDENCE OF INFECTION OF THE THROAT AND GUMS.

	1941				1942				1943			
	N	S	V	Total	N	S	V	Total	N	S	V	Total
January..	5	5	8	18	3	8	17	28	5	2	12	19
February	6	2	8	16	—	8	8	16	2	2	4	8
March ..	5	5	2	12	1	10	11	22	—	4	2	6
April ..	7	3	2	12	3	9	5	17	1	1	2	4
May ..	6	4	5	15	—	1	11	12	—	3	2	5
June ..	3	7	5	15	—	3	3	6	—	—	—	—
July ..	5	4	6	15	4	4	5	13	—	—	—	—
August ..	1	4	4	9	5	3	15	23	—	—	—	—
September	1	5	3	9	1	5	21	27	—	—	—	—
October..	—	8	8	16	—	2	15	17	—	—	—	—
November	2	3	9	14	3	3	6	12	—	—	—	—
December	5	9	7	21	3	4	4	11	—	—	—	—

N = Cases from which no specific organism was isolated.

S = Cases of hæmolytic streptococcal infection.

V = Cases of Vincent's infection.



The cases may be classified on bacteriological grounds and subdivided clinically into the groups and sub-groups shown in Table II. The monthly incidence of the commoner groups is included in Table I and the Chart. The only striking features of these figures are the reduced incidence of the infections during the mild winter of 1942-1943 compared with the severe winter of 1941-1942 and the increased prevalence of Vincent's infection in the autumn of 1942. Unfortunately it is not possible to correlate these findings with the number of troops in the district at the different periods.

TABLE II.—BACTERIOLOGICAL CLASSIFICATION AND CLINICAL SUBDIVISION OF CASES.
AVERAGE AGE AND STAY IN HOSPITAL. OCCURRENCE OF PROTEINURIA.

							No. of cases	Average age (years)	Stay in hospital (days)	Cases of Proteinuria (per cent)
Diphtheria	..	..	..	..	..	..	8	24.4	—	—
No Specific Organism	..	..	..	..	..	..	76	25.7	9.8	17.1
1. Catarrhal Tonsillitis	..	..	..	..	..	..	40	25.3	7.4	10.0
2. Chronic Tonsillitis	..	..	..	..	..	..	33	26.6	12.75	27.3
3. Peritonsillar Abscess	..	..	..	..	..	..	3	27.1	13.1	—
Hæmolytic Streptococcus	..	..	..	..	..	..	135	26.4	12.7	40.0
1. Simple Tonsillitis	..	..	..	..	..	..	101	26.6	12.0	35.6
2. Peritonsillar Abscess	..	..	..	..	..	..	34	25.9	14.7	52.9
Vincent's Infection	..	..	..	..	..	..	203	26.0	11.5	17.7
1. Tonsillitis	..	..	..	..	..	..	102	24.9	10.8	13.7
2. Gingivitis	..	..	..	..	..	..	71	26.0	12.3	18.3
3. Tonsillitis and Gingivitis	..	..	..	..	..	..	30	23.0	12.4	30.0

A.—DIPHTHERIA.

The eight cases of diphtheria were removed from the wards immediately the diagnosis was established and are not further discussed here.

B.—CASES IN WHICH NO SPECIFIC ORGANISM WAS ISOLATED.

Cases in which no specific organism was isolated from the throat swab comprised 18 per cent of the total admissions. They were subdivided on clinical grounds into the following groups.

(a) *Catarrhal Tonsillitis*.—This condition is characterized by enlargement of the tonsils with generalized infection of the pharynx but without exudate or ulceration. It is probably to be regarded as a manifestation of the common cold. Of the present series of cases 40 fell into this sub-group. They showed slight or moderate pyrexia for one to four days and the condition resolved without specific treatment. The only treatment given consisted of carbolic mouth-washes and gargles and drugs of the aspirin group were given when headaches were troublesome. The average stay in hospital of these patients was 7.4 days.

(b) *Cases of Chronic Tonsillitis with Subacute Exacerbation*.—Thirty-three cases fell into this category. Many of them were already earmarked for tonsillectomy and the typical history was of a long succession of sore throats separated by shorter and shorter periods of freedom. It seemed that only by tonsillectomy was a lasting beneficial result to be obtained in these cases. On examination, the throats of these patients presented a variety of appearances. In some the tonsils were greatly enlarged, with prominent crypts often filled with caseous debris; in others they were small, fibrosed and irregular; while in a third group an intermediate condition of the tonsils was seen.

Treatment again consisted of carbolic mouth-washes and gargles but, in these cases, use was also made of direct applications to the diseased tonsils. Mandl's paint, 5 per cent chromic acid, 5 per cent silver nitrate and 10 per cent hydrogen peroxide were used at different times.

The average stay in hospital of these patients was 12.75 days but all were referred to the ear, nose and throat surgeon with a view to tonsillectomy.

(c) *Peritonsillar Abscess*.—Only three cases of peritonsillar abscess have been seen in which bacteriological examination has failed to reveal any specific causative organism. On clinical grounds these three cases were indistinguishable from the larger group of cases of peritonsillar abscess (*vide infra*) in which a hæmolytic streptococcus was isolated. It seems probable that these cases were, in fact, due to hæmolytic streptococcal infection but that the organism was lodged in the submucous cellular tissues and therefore inaccessible to the throat swab. In all these cases the abscesses subsided on chemotherapy, without discharging, so that no pus from the actual abscess became available for examination.

C.—STREPTOCOCCAL INFECTION.

One hundred and thirty-five cases, or 31·3 per cent of the total admissions, come under this heading. They can be subdivided into cases of simple tonsillitis and cases of peritonsillar abscess.

(a) *Simple Streptococcal Tonsillitis*.—One hundred and one cases of this class have been seen and the average period of hospitalization was 12·0 days. Constitutional disturbance was, in most cases, severe with pyrexia reaching to 101–104° and lasting for a period of three to twelve days, though cases with more than six days of fever were unusual.

The tonsils showed various degrees of inflammation and the following stages were defined : (i) diffuse reddening and injection without exudate ; (ii) exudate present at the mouths of the tonsillar crypts giving the typical spotted appearance of follicular tonsillitis ; (iii) confluent exudate present over large areas of one or both tonsils, giving an appearance of false membrane.

Streptococcal exudate is easily detached by a swab and is usually readily distinguished from the greyer and more adherent membrane of diphtheria ; in 16 cases however a doubt as to the nature of the condition led to the administration of diphtheria antitoxin before the result of the throat swab was obtained.

The stages listed above were not all seen in every case. Many patients were admitted in stage (ii) or (iii) while in other cases resolution occurred directly from stage i or ii and the more advanced features did not develop.

Treatment of these cases can be discussed under three headings—symptomatic treatment, local treatment and specific treatment.

Symptomatic treatment consisted largely in the administration of analgesic drugs of the aspirin group to relieve the headaches and muscle pains which were common concomitants of the condition. In cases with conspicuous or painful cervical adenitis antiphlogistic collars were often found to afford considerable relief.

Local treatment consisted of mouth-washes, which were used in all cases, and local applications to the tonsils which were employed in cases which did not receive specific treatment. The preparations employed in local treatment were the same as those used in the previous group of cases.

Specific treatment has consisted entirely in the use of drugs of the sulphonamide group ; streptococcal antitoxin has not been used. Sixty-eight of the patients received chemotherapy, sulphanilamide having been used in thirty-six cases, sulphapyridine in twelve cases and sulphathiazole in eighteen cases. The usual precautions (administration of abundant fluids and alkali, frequent examination of urine and blood) were taken to guard against the toxic effects of these drugs. The drugs were given at four-hourly intervals, commencing with two doses of 2 grams each and continuing with 1 gram doses. The 2 a.m. dose was omitted after the first twenty-four hours if the patient was sleeping. Exhibition of the drugs was continued for twenty-four to thirty-six hours after the temperature had settled or for a maximum of six days. In only a few cases was treatment for more than four days required. In three cases, all receiving sulphapyridine, treatment had to be prematurely discontinued because of troublesome vomiting. In eight others (four sulphanilamide, one sulphapyridine and three sulphathiazole) it had to be discontinued because of the development of a considerable leucopenia. All these cases made uninterrupted recoveries.

Statistical assessment of the value of chemotherapy in streptococcal tonsillitis cannot be attempted from a consideration of these cases as there was conscious selection of the cases to whom the treatment was given—it was, in fact, withheld only from the milder cases. Based, however, on that notoriously inaccurate *bête noire* of scientific medicine—the clinical impression—the following “conclusions” are tentatively advanced:—

(1) Chemotherapy does not shorten the period of hospitalization of the ordinary mild case of streptococcal tonsillitis.

(2) Chemotherapy is indicated in cases seen early with severe constitutional disturbance or with conspicuous cervical adenitis.

(3) The most definite indication for chemotherapy is the presence of a considerable leucocytosis as shown by a white blood cell count above about 13,000 per c.mm. Such a leucocytosis probably indicates a spread of infection into the peritonsillar cellular tissue and the imminent development of peritonsillar suppuration.

(4) Chemotherapy administered to severe cases reduces the incidence of complications—suppurative adenitis, suppurative otitis media and secondary peritonsillar abscess.

(5) Chemotherapy causes more rapid disappearance of the hæmolytic streptococcus from the throat than occurs in untreated cases.

Complications.—Suppurative complications have been surprisingly few among this series of cases. No case of suppurative otitis media occurred and in three cases only did a mild catarrhal otitis media develop. These cases quickly subsided on conservative treatment. Similarly there has been no case of suppurative adenitis. Secondary peritonsillar abscess (i.e. peritonsillar abscess developing in a patient having only tonsillitis when first seen) has occurred in seven cases and these have been included amongst other cases of peritonsillar abscess discussed below.

Though proteinuria (*vide infra*) has been a common finding in these patients, in only four cases has a diagnosis of nephritis been made. Two of these patients had previously suffered from the disease.

Four patients developed mild attacks of rheumatism eight to sixteen days after admission to hospital.

(b) *Peritonsillar Abscess.*—Thirty-four cases of hæmolytic streptococcal peritonsillar abscess have been seen. The average stay in hospital was 14·7 days compared with 12·0 days for the cases of simple streptococcal tonsillitis. In twenty-seven of these patients the abscess was present on admission. The remaining seven cases, as pointed out above, were admitted with simple streptococcal tonsillitis and developed a secondary peritonsillar abscess after admission. The left side was affected in eighteen cases and the right side in ten cases while in six cases the affection was bilateral.

Constitutional disturbance was similar to that seen in the more severe cases of simple streptococcal tonsillitis but local pain was of course much more severe and cervical adenitis was a constant feature.

Symptomatic and specific treatment were along the same lines as in the simple streptococcal tonsillitis cases. Eighteen cases received sulphanilamide, four sulphapyridine and twelve sulphathiazole. Cyanosis was often a marked feature with sulphanilamide and vomiting was troublesome in five of the other cases but in none was it necessary to discontinue treatment before the desired course had been given; and in no case did the leucocyte count fall to dangerously low levels.

Local treatment consisted of the following measures:—

(1) The use of carbolic and bicarbonate gargles given as hot as the patient could tolerate.

(2) Spraying and syringing with the same solutions. This was used after the abscess had discharged or been incised.

(3) Incision of the abscess. This operation was resorted to in only ten of the cases and was performed by the ear, nose and throat surgeon to the hospital. It was reserved for cases seen late in the disease, in which a considerable quantity of pus had formed and had not discharged spontaneously, and for cases in which the accumulation of pus continued in spite

of chemotherapy. Of the twenty-four cases treated without incision eight showed spontaneous discharge of the abscess while in the remaining sixteen cases the abscesses resolved without discharging.

Statistical assessment of the value of chemotherapy from consideration of these cases is again impossible, owing to the absence of an untreated control group. The facts that in none of these cases did the suppuration spread beyond the peritonsillar region and that no other complications were seen, lend strong support, however, to the now widely held view that chemotherapy is a valuable weapon in the treatment of peritonsillar suppuration. It seems clear that by its use operation can be avoided, in the great majority of cases seen early, and that the incidence of many of the dangerous sequelæ of the condition can be reduced to a minimum.

Of the thirty-four cases of peritonsillar abscess seen, twelve were recommended for tonsillectomy at a later date because of the persistent unhealthy state of the tonsils combined with a history of frequently recurring sore throats.

D—VINCENT'S INFECTION.

The diagnosis of Vincent's infection has been based upon a combination of clinical and bacteriological findings. Clinically the cases included in this section have all been characterized by the occurrence of typical sloughing necrotic ulceration of the gums or in the region of the fauces or in both these sites. A distinctive and unpleasant foetor of the breath is an additional diagnostic feature. The diagnosis has been confirmed in all cases by the microscopic examination of stained smears of the necrotic material. It is important that these smears should be made before treatment is commenced as the diagnostic appearances may be lost within a few hours of a single application of such antiseptics as chromic acid or silver nitrate. It is also important to realize that bacteriological diagnosis depends upon the finding of the spirochaetes and fusiform bacilli (Vincent's organisms) in large numbers—easily outnumbering any other bacterial forms that may be present. The mere finding of a few spirochaetes and fusiforms amongst a preponderance of other forms is by no means diagnostic though this is the appearance frequently encountered in true cases of Vincent's infection after treatment has been commenced. Swabs have also been examined for the presence of the hæmolytic streptococcus and this organism has been found as a not uncommon concomitant of the infection.

In all, 203 cases of Vincent's infection have been seen, forming 48·1 per cent of the total admissions to the ward and constituting the largest single group. These cases may be subdivided according to the distribution of the ulceration.

(a) *Cases with Tonsillitis Only.*—102 cases, or 50 per cent of the cases of Vincent's infection, fall into this subdivision. The average period of hospitalization was 10·8 days. The ulceration was bilateral in 28 cases, right sided in 36 cases and left sided in 38 cases.

Pyrexia after admission to hospital was present in less than half the cases (47·5 per cent) and it was a striking fact that the degree of constitutional disturbance appeared to bear no direct relationship to the severity of the faucial lesions. In 22·5 per cent of these cases a hæmolytic streptococcus was isolated in culture from the throat swabs in addition to the findings of a preponderance of Vincent's organisms in the stained smears of the necrotic material. As the clinical features of these cases with mixed infection were entirely those related to the Vincent's organisms the cases have been classified in this group only. Constitutional disturbance in these cases of mixed infection was no more severe than in the remainder of the group and pyrexia occurred in only a slightly larger proportion (51 per cent as compared with 47·5 per cent for the whole group). In short the addition of a hæmolytic streptococcus to a case of Vincent's infection did not seem to increase the severity or the duration of the disease.

(b) *Cases with Gingivitis Only.*—Seventy-one cases of Vincent's infection were seen in which the ulcerative process was limited to the gums. The disease was almost invariably associated with abnormalities of the teeth or gums, the most frequent underlying lesions

being (i) extensive dental caries ; (ii) the presence of flaps of redundant gum tissue usually overlying an erupting molar or at the site of a recent extraction ; (iii) overcrowding of the teeth with the formation of irregularities and pockets in the gum margin and (iv) the presence of large collections of tartar around the necks of the teeth.

In a small number of cases, however—the number has not been accurately recorded—the infection occurred in an apparently healthy mouth. In these cases the gums in the upper and lower incisor regions were involved and the appearances certainly suggested direct implantation of the infection at these sites. Such implantation could occur by the use of infected drinking mugs or in the act of kissing.

Constitutional disturbance in most of these cases was slight and consisted for the most part of nausea and debility with, sometimes, headache and constipation. Pyrexia was present after admission to hospital in only nineteen cases (28·8 per cent).

(c) *Cases with Tonsillitis and Gingivitis.*—Thirty cases were seen in which the ulceration involved the fauces and gums simultaneously. The commonest sequence of events appeared to be for the infection to spread back to the fauces from an infected gum flap over an incompletely erupted lower posterior molar tooth. In this connexion it is interesting to note that the average age of this group is somewhat lower than that of any of the other groups (see Table II). In other cases, however, no such direct connexion between faucial and gingival infection could be made out.

Nine of the cases (30 per cent) showed the presence of secondary hæmolytic streptococcal infection, noted above as occurring in 22·5 per cent of the cases with tonsillitis only.

TREATMENT OF CASES OF VINCENT'S INFECTION.

Infected patients were isolated and debarred from communal feeding places during the active period of the disease. General treatment consisted of rest in bed during the febrile period with administration of a good mixed diet. Ascorbic acid was given in quantities of 150 mg. a day during the period in hospital. This was done not in the belief that the condition was due to a vitamin deficiency—in fact a group of eleven cases investigated showed no evidence of deficiency—but because the opinion is now widely held that these infections heal more rapidly when an excess of this vitamin is present in the tissues.

Local treatment has varied from time to time and many different applications have been tried. Silver nitrate (2 per cent), chromic acid (5 per cent), zinc sulphate (2 per cent) and hydrogen peroxide (10 per cent) have all been used with success. Local applications of neoarsphenamine (N.A.B) solutions gave inferior results. The method at present in use is to swab the ulcerated regions with 5 per cent chromic acid solution and to follow this with a hydrogen peroxide wash. This is done once to thrice daily according to the severity of the condition. In the gingivitis cases the toothbrush in use is destroyed on admission and a new soft one is provided when all ulceration accessible to the brush has healed. These cases are also seen by the dental officer to the hospital who carries out treatment directed at removing the dental abnormalities mentioned above which so frequently are responsible for persistence and relapse of the condition. In a few of the more chronic cases packing of the gums with zinc oxide and clove oil paste has been used by the dental officer with good results.

Specific Treatment.—There is a fairly widespread belief that treatment with neoarsphenamine and allied arsenical preparations, either by local application or by intravenous injection, has a specific curative action against Vincent's infection. Neoarsphenamine (N.A.B. in aqueous solution) was used as a local application in 34 of the earlier cases of this series but the impression was formed that it was definitely inferior in its action to oxidizing agents such as chromic acid so that its use in this way was discontinued. Intravenous injections of N.A.B. in doses varying from 0·3 to 0·6 gram were given to 124 of the severer cases. The results observed were conflicting. In many cases of tonsillitis pain was relieved and the lesions ceased spreading and soon began to heal but in other cases the injection seemed to be without any obvious effect on the course of the disease. In cases of gingivitis N.A.B. injections seldom seemed to cause noticeable benefit though occasionally spread of the ulceration may have been checked.

In general it may be said that N.A.B. injections though sometimes having a beneficial effect on the course of the disease take second place to efficient local treatment in dealing with both gum and tonsil infections. In this connexion it is interesting to note that four cases have been seen in which typical Vincent's infections (two gingivitis; one tonsillitis and one combined tonsillitis and gingivitis) developed in patients actually undergoing courses of N.A.B. injections for syphilis.

This series of cases has provided no support for the idea that a nutritional deficiency underlies Vincent's infection. As mentioned above, eleven cases investigated by the ascorbic acid saturation test showed no evidence of vitamin C deficiency. Another small group of cases was given nicotinic acid by mouth and intravenously but derived no benefit from this treatment.

Circumstantial evidence of infectivity was obtained in many ways. Several groups of cases from a single billet were seen and many cases gave a history of contracting the infection while on leave, their wives having been suffering from bleeding gums prior to their arrival.

THE OCCURRENCE OF PROTEINURIA (ALBUMINURIA).

The urine of all patients was examined the morning after admission to hospital and daily while receiving chemotherapy. The occurrence of proteinuria in the various groups of cases is shown in Table II and compared with the rate in one thousand successive admissions to the orthopaedic and ophthalmic wards of the hospital, the tests being performed by the same technicians. It will be seen that the greatest incidence was in the peritonsillar abscess cases and the lowest amongst the cases of catarrhal tonsillitis. Among the Vincent's cases the incidence of proteinuria bears a direct relationship to the extent of the ulcerated area. All groups except the cases of catarrhal tonsillitis show a significant increase above the incidence of proteinuria amongst the control group of surgical non-renal cases.

DIFFERENTIAL DIAGNOSIS.

There are three conditions for which a sharp lookout must be kept by any medical officer dealing with cases of oral and pharyngeal infection. The first of these—glandular fever or infective mononucleosis—is not uncommon. The other two—acute leukæmia and agranulocytic angina—are relatively rare. During the period under review twenty-four cases of glandular fever and one case of acute myeloblastic leukæmia have found their way into the wards with a primary diagnosis of throat or gum infection. No case of true agranulocytic angina has been seen.

Mistakes and delays in the diagnosis of these conditions will be avoided if the following indications for total and differential white cell counts are observed: (1) Lymph gland enlargement extending beyond the anterior triangle of the neck. (2) Failure to isolate a pathogenic organism from the throat swab in spite of the presence of faucial exudate—a common finding in glandular fever. (3) Unduly prolonged pyrexia. (4) Extension of ulceration beyond the usual sites.

In addition, it is important to bear in mind that a swab positive for Vincent's organisms or hæmolytic streptococcus does not exclude the possibility of a more serious underlying pathology. The case of leukæmia and nine of the cases of glandular fever mentioned above showed swabs positive for Vincent's organisms on admission.

SUMMARY.

An account is given of 422 patients treated during a period of two and a half years in wards set aside for cases of throat and gum infection. The cases have been grouped on bacteriological findings and subdivided on clinical grounds. The treatment employed has been described and the impressions formed recorded. Unfortunately these are only impressions for control groups were not used. The occurrence of proteinuria, which was surprisingly high in some groups, is summarized in Table II. The importance of white blood cell counts in diagnosis is stressed.

I would like to thank Colonel Wallace Benson, C.B.E., D.S.O., for his help and for permission to forward this paper.

SURGERY IN WEST AFRICA: EXPERIENCES IN A MILITARY HOSPITAL.

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THE observations made in this article are based only on cases seen personally during the past two years.

Many of the conditions described are common to all districts but the inhabitants of different provinces are subjected to varying bacterial, parasitic and climatic assaults on their persons.

We have both been fortunate in that, in addition to being on the staff of a West African General Hospital, our duties have carried us to many parts of the colony. We have seen the African in his own environment—from the mangrove swamps of the coastal belt through the creeks to the rain forest; across the "fly belt" and over the plateau to the scrub and sand of the North. We have also had the benefit of the constant advice of Captains Ormiston and Hanlon (W.A.A.M.C.) and other Colonial Medical Officers all of whom have had many years' experience of medicine on the "Coast."

The hospital drained a large African recruit-training centre and consequently the variety of cases was greater than in most stations. Representatives of almost all tribes in the colony were seen and the experience gained in one tour was greater than would normally be possible.

There were two operating theatres and the "clean" and "septic" cases were segregated. Almost 80 per cent of the surgery was pyogenic and no unnecessary risks were taken with clean cases. Pre-operative and operative technique differed in no respect from that normally adopted and the incidence of accidental infection was no greater than in a temperate climate. Wound dressings were light and, with the exception of closed plaster cases, were never sealed. This is our normal practice at home but it is emphasized here as there is a tendency for wounds to become sodden owing to the excessive sweating which occurs in a humid, tropical climate. The wounds were not normally inspected until the stitches were removed on the seventh or eighth day.

The types of operation performed were: Herniotomy, operative cure of hydrocele, removal of thyroid adenoma, craniectomy, skin graft, bone graft, open reduction of fractures, laparotomy (for splenectomy, traumatic perforation of gut, appendicectomy, etc.), Schwartz operation for acute mastoiditis and intraocular operations.

One expected all wounds to heal by first intention. Few burns and scalds were seen and those treated by coagulation therapy healed uneventfully.

Although elephantiasis constitutes a common surgical problem in civilian practice we saw no military cases requiring operative interference. This was to be expected owing to the thorough examination of recruits and the slow onset of the condition.

I.—SURGICAL CONDITIONS PECULIAR TO THE TROPICS.

The following section is devoted to conditions peculiar to the tropics which we ourselves have seen and treated. We do not propose to discuss ætiology in detail but hope to offer some practical advice to newcomers to the tropics. Consequently the arrangement is frequently regional rather than ætiological and we apologize to our more academically-minded colleagues for any unorthodox classification of tropical diseases.

(A) *Tropical Myositis*.—This condition is characterized by a tender, hot, indurated swelling outlining a muscle. Several muscles may be affected simultaneously but more

commonly the disease affects one muscle. At varying intervals other muscles may be affected. Until sulphathiazole was available 20 per cent of the lesions subsided by heat (wet or dry) or by "masterly inactivity." In 100 per cent of cases the infecting organism was the *Staphylococcus (aureus or albus.)* When chemotherapy with sulphathiazole was commenced 50 per cent of the cases subsided without pus formation when local heat was combined with the administration of this drug. In those which did not resolve pus formation occurred, apparently in the body of the muscle, although in a few cases pus was found in the intermuscular planes.

The most common sites were the adductors of the thigh and the quadriceps (40 per cent of all cases). Other muscles frequently affected were the glutei, latissimus dorsi, pectorals and gastrocnemii. Myositis was also seen in the biceps, deltoid, triceps, forearm flexors and sternomastoid.

In one hundred consecutive cases the blood was examined for organisms and parasites and red cell, white cell and differential counts were made. Of all these examinations the presence of *Microfilaria bancrofti* in the blood in 40 per cent of cases was the only factor which appeared to give a clue to ætiology. In only three cases were adult filariæ isolated from the pus. A definite history of injury to the affected region was rarely available. At least 30 per cent of all potential recruits examined suffered from an infected skin condition—mainly affecting the buttocks and thighs—which, throughout the West Coast, is known as Kraw-Kraw. This condition is usually due to scabies and clears up with baths and sulphur ointment.

The only ætiology we can suggest for tropical myositis is: (1) Filarial blockage of the lymphatics of a muscle; (2) chronic staphylococcal bacillæmia following Kraw-Kraw.

The staphylococci proliferate in a muscle whose vitality is lowered by lymphatic obstruction.

Multiple abscesses occurred in 40 per cent of all cases of myositis and of these 5 per cent developed true pyæmia with the formation of typical pyæmic abscesses. One patient in the series died after fifty-six abscesses had been evacuated by incision or aspiration.

Treatment.—Routine treatment was by heat (fomentation, kaolin, dry heat or infra-red radiation) combined with sulphathiazole in doses of from 6 to 12 mgm. in twenty-four hours. As stated above, 50 per cent of cases subsided with this treatment, frequently leaving an elongated fibrous mass in the body of the muscle. Fluctuation was difficult to detect in deep muscle abscesses and not infrequently the muscle was incised only because the local condition or the state of the patient was not improving on more conservative treatment. In some cases pus formation was confirmed by aspiration before incision. After adequate incision the abscess cavities were lightly packed with gauze wrung out of eusol.

The average duration of stay in hospital was thirty-eight days.

It was noted that in any marked degree of pyogenic infection and in surgical tuberculosis, in the African, there was a frequent tendency to develop acute anæmia. This had a rapid onset and within a week patients showed a change from the normal, healthy colour of the "Black" to the greyish-yellow colour of the anæmic African. Blood-counts of $1\frac{1}{4}$ to $1\frac{1}{2}$ millions were common findings with heavy bacterial infections. Six true sickle-cell anæmiæ were found in such cases and the septic anæmiæ appeared to resemble this disease in their acute onset. In most cases when sepsis was successfully combated the red cell count was rapidly restored to normal limits. In others frequent blood transfusions were considered essential.

Early in one's tour it is not always easy to differentiate between a sick and a healthy African. A very useful indication of an African's general condition can be gathered from the appearance of his "wool." In sickness, the crisp, curly black hair of the head assumes a lifeless grey-black colour which one soon learns to recognize.

(B) *Tropical Lesions of the Feet.*—(i) *Infected Hæmatoma of the Foot (Stamp Foot).* "To wear or not to wear boots?"—This has been a controversial subject, discussion on which has ranged around the African soldier for several years. So many factors are involved

that a full discussion would be outside the scope of this article. The Mohammedan from the North has a hyperkeratinized sole and a thin calf which is not adapted to carrying heavy footwear. Many of the Southerners—particularly tradesmen—have been accustomed to footwear and suffer quite considerably from impact of their recently uncovered feet on the hard laterite gravel. These factors are mentioned as only two instances of the difficulties surrounding this problem of footwear.

The African soldier delights in stamping his feet when coming to a halt, turning about or executing any other manœuvre. (Off duty, recruits continue to "drill" one another for hours on end.) In spite of strict orders to the contrary he seizes every opportunity, when his officers or N.C.O.s are absent, to stamp his feet on the stony-hard ground. Even the hyperkeratinized sole cannot stand up to this treatment and it is not uncommon to have fifteen men in one ward suffering from a hæmatoma acquired in this way and subsequently infected. From the apparent ætiology we have named this condition "Stamp Foot." If not evacuated by incision, the pus eventually tracks to the surface, frequently as a collar-stud abscess, and

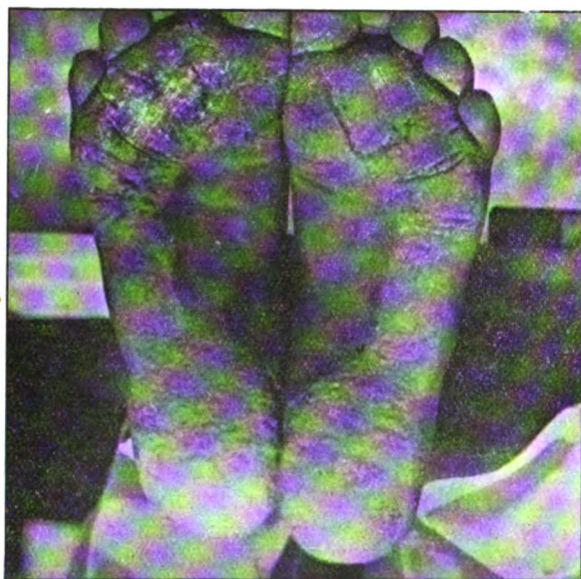


FIG. 1.—Foot yaws.

healing may be long delayed. Many of the patients pare the skin over the hæmatoma with a razor blade before admission and not infrequently make an incision—usually inadequate—with the same popular instrument.

These abscesses were most commonly in the heel and pus was often difficult to localize in the early stages.

Treatment.—Early evacuation with the smallest incision compatible with adequate drainage.

"Stamp foot" constitutes an important cause of loss of man hours.

(ii) *Foot Yaws.*—This condition is said to be due to the pressure of yaws tubercles on the thick epidermis of the sole of the foot. This frequently leads to a typical awkward gait and the condition is thus also known as "Crab yaws." The lesions are so varied that rarely will two doctors agree in diagnosis. The most common manifestation was a worm-eaten or sponge-like condition usually of the heels. Other lesions were patches of desquamating hyperkeratinized epidermis usually circular in outline. Patients were seen showing pigmented areas of the sole with underlying tender nodules which reacted favourably to N.A.B.

This may also be a manifestation of tertiary yaws. The perforating ulcers which may be due to yaws are discussed under a separate heading. In making a diagnosis of foot yaws we tried to establish the following criteria: (a) a history of yaws; (b) yaws scars on the body or limbs; (c) a positive Kahn test (40 per cent of cases investigated showed a positive Kahn, but this may have been due to syphilis. On the other hand many cases of yaws have been treated during the primary or secondary stages by arsenicals—frequently an incomplete course—thus rendering the value of the test doubtful) and (d) spongy heels.

The differential diagnosis was made from sandcracks, infected hæmatoma or “stamp foot” and chigger infestation.

Early in our tour one of us (W. M. D.), while acting as R.M.O., picked out a squad of men diagnosed as foot yaws. They were taken on a 16 mile route march and not a single man fell out! Whatever the manifestations of foot yaws may be there is, nevertheless, a common disabling condition of the feet which causes great pain.

When an African soldier reported sick with foot yaws we eliminated the possibility of foot strain and sepsis. Unfortunately the African delights in “injections” and knows that the treatment of foot yaws is given by injection. Apart from the *Ju-ju* attached to injection his desire for N.A.B. is founded on two reasons, (a) the benefit he derives from the tonic effect of the arsenicals and (b) the relief from itching of his Kraw-Kraw (described above under “Myositis”). He also knows that he may be allowed to wear boots, be excused from parades or, if he is particularly lucky, be boarded out of the Army. In our series, 60 per cent of cases of foot yaws were symptomless. Approximately 50 per cent of the remainder were “bad soldiers”—usually over 30 years of age. 100 per cent showed healed yaws scars.

Treatment.—The drugs used were N.A.B., M.A.B., potassium iodide and bismuth preparations such as sodium potassium bismuth tartrate.

Our most rapid and satisfactory results were obtained by keeping the patients in bed for one or two weeks and giving intravenous N.A.B. (starting with 0.3 gramme) at weekly intervals. At the same time large doses of potassium iodide (up to 90 grains *per diem*) were administered. Thereafter the soldier was returned to duty wearing boots and four further injections of N.A.B. were given by his R.M.O.

In view of the expense and shortage of these drugs the following routine treatment was adopted, usually in the out-patient department:—

First week: Attend B (light duty) with boots and 0.30 gramme N.A.B.

Second week: Attend B with boots and 0.45 gramme N.A.B.

Third week: Attend A (full duty) with boots and Sobita 1 c.c. intramuscularly.

Fourth week: Attend A with boots and Sobita 1 c.c. Boots could then be dispensed with.

By the use of Sobita alone, improvement was slow but definite. Unfortunately we had several unpleasant local and general reactions to this drug and thereafter we were loth to use it. This experience was corroborated by Civilian Medical Officers.

With intramuscular N.A.B. alone no improvement was observed. When combined with massive doses of potassium iodide, improvement was slow but the final results were satisfactory.

We rarely saw any change in the appearance of the feet but, in those who stated that their pain had disappeared, the change in their general appearance and outlook was marked.

(iii) *Chigger Infestation.*—The honey-combed lesion resulting from multiple infestation by the chigger or sand-flea closely resembles foot yaws.

The impregnated female flea burrows into the skin of the toes or sole of the foot where she grows rapidly. The resulting wound becomes inflamed and painful. When her eggs are laid the surrounding tissues ulcerate and the parasite may be expelled spontaneously.

Treatment.—The entrance wound was enlarged with a needle and the parasite removed complete. The African is usually more skilled in this procedure than the European.

(iv) *Perforating Ulcers of Foot.*—Perforating ulcers of the heel or ball of the foot were accepted as manifestations of yaws or syphilis during our first fifteen months. During

the following month ten cases were under treatment simultaneously in one ward and two different types were observed. More detailed observations were carried out in twenty-nine cases during the next six months and the results of these investigations are summarized.

Type 1: In twelve cases the ulcers were single and in the early stages appeared as a discoloured patch of cutaneous gangrene. The area sloughed and a smooth-walled ulcer with black sides and base was formed. The ulcers varied in size from one-third to one and one-quarter inches in diameter and frequently extended to a depth of three-quarters of an inch. Pain was complained of at all stages but was negligible in proportion to the appearance of the ulcer. Four cases gave a history of yaws and showed healed yaws scars. In eleven cases the Kahn was negative. No constant organisms were found on bacteriological examination and section of the ulcer walls showed no typical histology. Radiological examination showed no reaction in the underlying periosteum or bone even in the deepest ulcers.

Treatment.—No improvement was noted in any case following a course of N.A.B. Complete excision was carried out in five cases and satisfactory healing occurred within periods

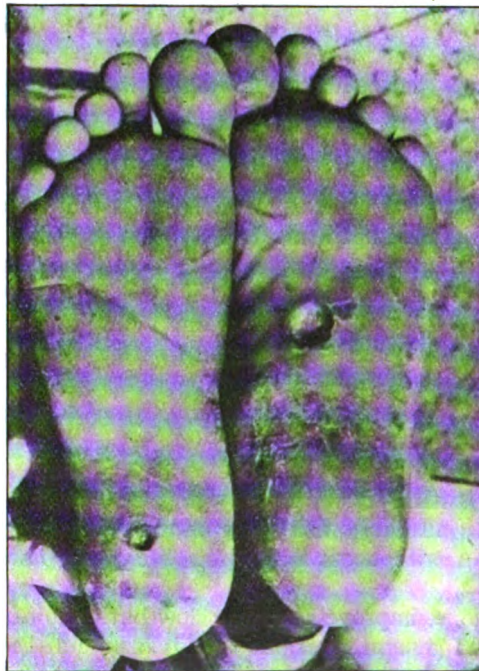


FIG. 2.—Perforating ulcers of feet.

varying from three weeks to two months. Of the remaining seven cases two were scraped and carbolized and were healing slowly when last seen. The others were discharged from the Army. All cases were in natives of the Southern provinces and their average period of Army service was five months. The average duration of stay in hospital was fifty days. The possibility of self-infliction was entirely eliminated.

Type 2: In seventeen cases the ulcer was "stepped." The walls were brown and the base showed a pale, watery discharge. The ulcer appeared to be "punched out." In five cases the lesions were multiple and in two bilateral. The average diameter of the ulcer was one-third of an inch. Pain and tenderness were complained of in all cases and all showed a "Dover sole" pigmentation of the sole of the foot. Nine patients gave a history of yaws or exhibited typical scars of healed yaws. The Kahn test was positive in thirteen, doubtful

in one and negative in three cases. No constant bacteriological findings were made and no histology was performed.

Treatment.—Cure was effected in ten cases by a course of N.A.B. and Sobita. The average amount of N.A.B. given in a course was 1·95 grammes and of Sobita 2 c.c. The other patients were discharged from the Army, three having been given three courses of treatment. Twelve cases were from the Southern provinces and five from the borderland between the North and South. The average period of service was five and one-half months and of stay in hospital thirty-two days.

(v) *Ainhum.*—This is a condition of spontaneous amputation at the base of the fifth toe. Nine cases were seen and of these three were bilateral. In four, the patients stated that their fathers suffered from the same complaint.

The condition starts with a groove on the plantar surface and a fibrous ring finally encircles the toe. Radiologically, the bone is constricted at the same time as the cutaneous fibrous ring is apparent but no obvious X-ray signs of bone disease were noted. The toe becomes bulbous and may finally drop off.

Serological tests and histological examinations gave no clue as to ætiology.

Treatment.—Amputation when the toe became painful or interfered with the soldier's normal duties. Healing was uneventful.

(C) *Tropical Ulcer.*—One hundred and twenty-eight cases of cutaneous ulcer were investigated. The ulcers extended through the skin and subcutaneous tissues and varied from one-half to six inches in diameter. In the acute stages the edges were undermined and the base was covered with greyish, sloughing tissue with a purulent discharge. Occasionally the ulcer extended to expose muscle and tendon. In chronic cases the ulcer edges were raised, of regular outline and consisted of a vascular fibrous tissue. From this appearance it was presumed that healing from the margins had progressed so far but was arrested by the lack of an adequate blood supply. Radial incisions through this scar tissue frequently expedited healing. On excision of a chronic ulcer it was found that not only the edges but the entire ulcer area to a depth of half an inch consisted of almost cartilaginous tissue.

SITES OF TROPICAL ULCERS.

Site	No. of cases	Explanation suggested
1. Over lower third of tibia ..	41	Liability to trauma, relatively avascular, common site of old scarring
2. Over lateral malleolus ..	31	Liability to trauma, common site of old scarring.
3. Over middle third of tibia ..	26	As for 1
4. Over medial malleolus ..	15	As for 2
5. Suprapubic region	6	Common site of Kraw-Kraw, with accessibility for scratching and frequent secondary infection.
6. Other sites	9	—
Total	128	

The above table shows the sites in order of frequency with suggested explanations.

Other interesting facts which arose from the investigations were :—

(1) Cutaneous ulcers were more common in recruits than in old soldiers. The average period of service in eighty-five cases was five months.

(2) Thirty-two cases came from areas in which yaws is endemic.

(3) The ulcer occurred on the site of the old scars in thirty-eight cases.

(4) History of injury preceding the onset of ulceration was obtained in almost half the cases.

(5) Vincent's spirochæte was found in seventy-five cases and was associated with fusiform bacilli in twenty-eight. Diphtheroids and other organisms were found. There appeared to be no relationship between the incidence of Vincent's infection of the mouth and cutaneous ulcer. Within a period of four days three cases of ulcer showing Vincent's spirochæte were admitted from the same company of recruits. We found no definite evidence which might suggest that infection was due to contagion.

(6) Many of the recruits were undernourished on enlistment, possibly due to hookworm

infection from which so many Africans suffer. Ulcers were most frequent in men of this category.

(7) On histological examination of sections of ulcers the only constant appearance was that of marked leucocytic infiltration with fibrosis in the deeper layers.

Treatment.—As routine, all ulcers were dressed with normal saline for twenty-four to forty-eight hours. Thereafter smears were taken. During the past six months this was done personally by the pathologist. Cleansing of the wound was then attempted using eusol or hypertonic saline. When the lesion appeared clean most rapid healing was induced by exposure to ultra-violet rays. Other methods adopted with satisfactory results were :—

(1) Application of our own preparation of tulle gras or of vaseline gauze.

(2) Exposure to air after dusting the ulcer lightly with 1 per cent iodoform powder, mainly to keep off flies.

(3) The local use of sulphonamide as a powder or paste.

(4) Complete excision of the ulcer with carbolic acid of the base. Plaster of Paris and elastoplast as methods of treatment were abandoned after a fair trial. Usually the ulcer had extended when these coverings were removed. The result of the use of triple dyes was disappointing. Of these methods the appropriate one for each case was arrived at by trial and error.

In four cases skin grafting was employed with satisfactory results. One hundred and thirteen patients were returned to full duty and fifteen were discharged from the Army owing to extensive or adherent scarring which would be liable to break down or had already done so.

The duration of hospital treatment varied from 9 to 102 days. This period did not bear any constant relationship to the appearance, size or site of the ulcer.

(D) *Filariasis.*—The filaria which have produced the lesions in this group are : (1) *F. bancrofti* ; (2) *O. volvulus* ; (3) *F. loa* ; (4) *Dracunculus medinensis*.

(1) *F. bancrofti.*—This filaria is carried by *Culex*, *Aedes* and *Anopheles*. The only confirmed surgical lesions dealt with were filarial hydroceles. The diagnosis was made at operation. In view of the high incidence of *Microfilaria bancrofti* in the blood in tropical myositis we have already suggested that this parasite may be an ætiological factor in that disease.

(2) *O. volvulus.*—Infestation with this parasite is called Onchocerciasis. The parasite is carried by the Buffalo gnat. We encountered two types of lesion due to this filaria.

(a) Superficial fibrous swellings over bony prominences (Onchocercal cysts). These swellings may be bilateral and relatively symmetrical. The common sites were : (i) Over the great trochanter (bilateral in three cases) ; (ii) over the olecranon (bilateral in five cases) ; (iii) over the medial femoral condyle (bilateral in three cases) ; (iv) lower third of ulna ; (v) over the medial epicondyle of the humerus. Fifty-two cases were dealt with.

The swellings were usually symptomless and varied in size from a pea to a walnut. The patient reported sick when the "tumour" had been subjected to trauma, not infrequently due to native "medicine." On section the tumours showed dense fibrous tissue with female parasites embedded in the tumour wall or male parasites coiled up in the cystic spaces.

The differential diagnosis is made from simple neoplasms, exostosis, neuro-fibromatosis and the juxta-articular nodes of yaws. We were never successful in confirming a diagnosis of juxta-articular nodes. All cases with this diagnosis proved to be onchocercal cysts.

Treatment.—If causing symptoms they were excised under local anæsthetic.

(b) In the inguinal region filarial cysts were found attached to the distal ends of hernial sacs and to the spermatic cord—simulating hydrocele of the cord. These cysts contained milky fluid in which microfilariae were found. Several cases of filaria hydrocele of the tunica vaginalis were found at operation.

(3) *Loa loa.*—The most common lesion due to this parasite is the "Calibar Swelling." These swellings are common in Europeans and Africans and are due to the microfilaria *loa* carried by the Red fly (*Chrysops dimidiata*). The lesion may be a local anaphylactic reaction of the subcutaneous tissues. The swellings were either diffuse or circumscribed and they appeared suddenly. They were usually painful and their only surgical importance lay in

that, in the African, they may have been mistaken for abscesses unless carefully examined. If left severely alone the swellings normally subsided in three to eight days. They were seen in almost every part of the body but no case went on to suppuration.

The most dramatic condition caused by *F. loa*, from the layman's point of view, affects the eye. One of the first questions a doctor is asked in West Africa is: "Have you ever taken a worm out of an eye?"

The orbital region was the only site in which we encountered symptoms caused by the adult parasite. The worm entered this region and the eyelids usually became œdematous. This may have been due to actual obstruction by the parasite or to tissue reaction to the worm or its excreta. Eventually the worm may traverse the plane between the conjunctiva and sclera and become visible to an observer. It is from this site that the extraction of the worm can be performed. The eye was cocaineized, the conjunctiva snipped with fine scissors and the parasite was extracted using two needles. It sometimes required to be divided before extraction could be effected. The condition is annoying rather than painful.

The Regimental Medical Officer in West Africa is expected to deal with this condition but owing to inexperience he usually sends the patient to hospital. Unfortunately the worm can appear in the eye and disappear again within twenty minutes. It may actually vanish in a few seconds while the eye is being examined. This can be prevented by the immediate instillation of cocaine 2 per cent when the worm is seen. The cocaine anæsthetizes but does not kill the parasite which remains static for ten to thirty minutes. After this period it proceeds on its way from the eye. The average length of the parasite is about two inches and macroscopically it resembles a piece of white cotton thread. The main value of successful removal of the parasite is the psychological benefit derived by the patient.

Frequently patients complained of "worms in the eye." Although nothing was seen on examination they were insistent that they "felt" the worm. Occasionally complaints were made of "seeing" worms passing through the eye. This sensation may be caused by micro-filaria in the retinal blood-vessels.

(4) *Dracunculus medinensis*.—Dracontiasis is the condition due to invasion of the tissues by the guinea-worm. This is said to be the plague of fiery serpents which attacked the Israelites on the shores of the Red Sea. The infestation occurs from drinking water contaminated with infected Cyclops. The Cyclops is probably killed in the stomach but the larval parasites invade the gastric or duodenal mucosa. They then migrate through the tissue and the adult male and female parasites lodge in the subcutaneous tissue. The latent period from infestation to onset of symptoms appears to be from ten to fourteen months. The adult female travels towards the legs and feet in an attempt to return her progeny to water. A little blister appears on the skin and the head of the parasite protrudes. Through the œsophagus the larvæ are extruded from the prolapsed uterus. The adult male parasite was never seen.

The African usually knows where the worms are situated before there are any outward manifestations. Frequently the outline of the worm could be seen and felt under the skin, when the appearance simulated varicose veins. Just before the worm appeared through the skin there was usually localized swelling, heat and often severe pain. A few cases showed general reactions at this stage—headaches, vomiting, etc. In some cases of unexplained urticaria a guinea-worm has later appeared.

Most cases were treated at the unit Medical Inspection Room and only those with secondary bacterial infection, multiple infestation or synovitis (*vide Synovitis*) were admitted to hospital. The number of cases in hospital at any one time varied from fifteen to forty and, as the average duration of stay was five weeks, this condition is a serious cause of loss of man-hours.

Most patients came from the Northern Provinces and were admitted with a painful swelling of the lower leg or foot. Cases were seen with guinea-worms in the thigh, abdominal wall, scrotum and hand.

Treatment.—The affected part was rested and kept moist with wet dressings changed many times a day. When the worm extruded sufficiently the routine method was to wrap

it round a match. After gentle traction, the worm was wound round the stick, a turn or two each day, and very slowly extracted. There are two objections to this procedure : (i) Too great traction may result in rupture of the worm with consequent inflammatory changes. (ii) Winding the parasite round a match too early prevents the extrusion of the larvæ and may delay the release of the hook at the end of the tail of the adult.

The worm is frequently ruptured by the patient himself attempting to expedite the proceedings and abscess formation is common. This was usually subcutaneous but deeper lesions with sloughing of tendons were seen. A common site of sepsis was deep to the tendo Achillis. The abscesses were evacuated when indicated and frequently a worm was found free in the cavity. The prognosis in uncomplicated cases was good and the soldier back on duty within a month. Unfortunately multiple infestation was common. Nineteen worms were extracted from one unfortunate victim before he was boarded and even then there was evidence of further parasites.

The serious cases from the military point of view were those in which the worm lay around the knee or ankle joints. Following either acute or chronic infection grave disabilities occurred from marked periarticular fibrosis with limitation of movement to true arthritis with destruction of cartilage.

Calcified guinea-worms were not infrequently seen on X-ray as an incidental finding. These may cause chronic "rheumatic" pains.

The answer to this problem lies in the hands of the Civil Health Authorities and the Field Hygiene Sections.

(E) *Lymphogranuloma inguinale*.—This condition is classed as the sixth venereal disease and whenever possible is treated in the V.D. wards. We offer no original suggestion as to ætiology. We are grateful for the warning given us by Colonial Medical Officers against incising a climatic bubo once the glands have liquefied. Not infrequently we had to treat cases which had been incised elsewhere. Secondary infection had occurred with the formation of fistulous tracts which tended to coalesce. After prolonged treatment, frequently including wide excision, we were left with large raw areas which required Thiersch or whole skin grafting. The final results were not satisfactory from the military point of view.

Treatment.—In the early stages the glands could be excised *in toto*. When the glands liquefied drainage was effected by repeated aspiration or by a small incision with a tenotomy knife while the overlying skin was still healthy. This usually prevented sinus formation. The cavities were filled in various cases with Z.I.P., sulphanilamide solution or ether. Similar results were obtained by all these methods and by simple aspiration alone. Injections of antimony preparations were tried without success. In four Europeans a very satisfactory result was obtained with shock therapy induced by intravenous T.A.B.

(F) *Snake Bite*.—The mechanism of snake bite will not be discussed as the offending snake was rarely found in our thirty-five cases. In no case did any alarming general symptoms develop and no evidence of reduced coagulation-time of the blood was observed. There was thus no indication as to whether the snakes involved were colubrine or viperine. The common symptoms were local burning pain, spreading up the limb, shock, usually mild, and early swelling around the wound. Later œdema extended up the limb. All cases occurred in Africans.

Treatment.—First Aid : (i) Apply a tourniquet at once (a tie, handkerchief or other available material) well above the knee or elbow when the bite is of a limb. The tourniquet must be sufficiently tight to stop the venous but not the arterial flow. It will be released for ten to fifteen seconds every fifteen minutes.

(ii) Cleanse the skin area and incise the tissues with a knife or razor blade through the wound in the direction of the length of the limb.

(iii) Rub in potassium permanganate crystals to encourage bleeding.

(iv) Always try to obtain the body of the snake for confirmation of the species.

In hospital : polyvalent antivenene was administered, 5 c.c. just proximal to the wound and 10 c.c. intramuscularly. The nursing staff was warned to report immediately the onset of any signs of paresis or of hæmorrhage, either local or from the gums or any other sites.

One of us (A. L. D.) treated a European for the effects of snake venom in both eyes. A spitting cobra had ejected venom from a distance of four feet, spraying the victim's face at the level of the eyes. An African servant, in attempting to kill the snake a few minutes later, was sprayed over one arm. He suffered no ill-effects. The snake was eventually killed and brought to us for identification.

The incident occurred late at night and the patient was brought some considerable distance to hospital. He was seen within half an hour of the incident. The alacrity with which his colleagues acted was largely due to the popular belief that such an injury invariably led to permanent and complete blindness.

On admission the patient was distressed and very anxious about his condition. His appearance, on being led into the Ophthalmic Department, simulated a very severe degree of welder's "flash" conjunctivitis. The eyelids were œdematous and there were intense lachrymation, blepharospasm, photophobia and chemosis. Cocaine and adrenaline were immediately instilled with dramatic effect. Within a few minutes there was still some degree of photophobia but the pain, lachrymation and blepharospasm had disappeared. The patient could see once more and his anxiety abated. The eyes were then more thoroughly examined. The surrounding skin showed no effects from the venom. The conjunctivæ were intensely injected but the cornea appeared normal. The eyes were washed out and atropine and oil instilled, 10 c.c. of polyvalent antivenene were injected intramuscularly and morphine gr. $\frac{1}{2}$ given. The irrigation and instillation of oil were repeated two-hourly and atropine drops were used three times during the next twenty-four hours. By the following day all symptoms had disappeared, vision was normal and the eyes almost completely recovered. One cornea showed a group of five indentations which did not stain with fluorescein. On the fourth day the eyes were white but in view of his corneal condition he was detained for a further three days. The cornea presented the same appearance on his discharge from hospital. The eyes were re-examined on several occasions and there was no alteration in the condition of the cornea.

(G) *Scorpion Sting*.—This injury was common and frequently diagnosed as snake bite. Both Africans and Europeans were treated. The sting of an adult scorpion causes intense pain which spreads up the limb. The double puncture, indicative of the bite of a poisonous snake, is not present.

The pain is completely relieved by the injection of a local anæsthetic at the site of the sting. The pain may recur and the injection require to be repeated in three to six hours.

(H) *Amœbic Dysentery*.—Two surgical lesions were seen. (i) Only two cases of amœbic abscess of the liver required surgical interference. A course of emetine was given before and after operation and accurate localization was obtained by radiography and exploratory puncture. Both cases made a rapid and uneventful recovery. No necrosis of the skin occurred.

(ii) Four cases were admitted to hospital with a tender mass in the right iliac fossa. In three the diagnosis on admission was appendix abscess. In the fourth the pain and swelling had been present for five months and the differential diagnosis lay between neoplasm, ilio-cæcal tuberculosis, appendix abscess and abscess following dysenteric ulceration. All cases gave a history of dysentery on one or more occasions and in three *Entamœbæ histolyticæ* were found in the stools.

Laparotomy in all cases revealed abscess formation in the ilio-cæcal region. The appendix was never seen or felt and no perforations were found. Simple drainage followed by a course of emetine led to rapid recovery in all cases.

No confirmed case of acute appendicitis was seen in an African soldier. In view of the history and the rapid recovery following the exhibition of emetine these cases are submitted as abdominal abscesses following dysenteric ulceration of the cæcal region.

II.—LESIONS NOT PECULIAR TO THE TROPICS.

The following cases which we propose to discuss briefly are not peculiar to the tropics but additional ætiological factors render them worthy of mention.

(A) *Synovitis of Knee*.—Synovitis of the knee is a serious orthopædic problem in the African soldier. In forty-three cases eight progressed until true arthritic changes were present. In four cases no aspiration of the joint had been performed before the onset of these changes. Seventeen cases were discharged from the Army.

Ætiology.—The common causal factors in our series were gonorrhœa, trauma and dracontiasis. Cases were also seen in patients suffering from dysentery and from yaws and in these the synovitis was considered to be a complication of the primary disease. One case of confirmed tuberculous synovitis was seen.

Treatment.—(i) Immobilization in a Thomas splint. (ii) Aspiration and immobilization with a pressure bandage. In the presumed gonococcal cases (the gonococci were never found on aspiration) methods (i) or (ii) were combined with the administration of intramuscular sulphapyridine. Where dysentery, yaws or dracontiasis were the primary diseases the appropriate treatment was given.

The average period of hospitalization was fifty-two days.

(B) *Surgical Tuberculosis*.—Tuberculosis in the African is a grave and usually fatal condition. In the Surgical Division, the disease was seen in the cervical and lumbar vertebræ and in the humerus, tibia and skull. Tuberculous disease of the hip, knee and ankle joints and of tendon sheaths was also treated. In one case the lesions were multiple and skull, humerus and tibia were affected. The greatest problem in treatment was the difficulty of immobilization. The African will not submit to complete immobilization and a patient in a plaster of Paris jacket was quite capable of turning his face to the wall and "fading away." On his release from "bondage" the "dying man" took a new hold on life and his general condition improved rapidly.

All cases were discharged from the Army on medical grounds. On more than one occasion we have seen an African with acute tuberculous disease of the spine walk into hospital unaided although at least two lumbar vertebræ were completely destroyed, and a large retroperitoneal abscess was present.

Sickleæmia and the acute anæmias described under the heading *Myositis* were commonly seen in patients suffering from surgical tuberculosis. Frequent small blood transfusions brought about a marked improvement but the anæmia inevitably recurred.

(C) *Osteitis*.—In tertiary yaws, osteitis and periostitis most commonly affected the tibia or fibula, usually in a chronic form. Sabre-blade shin is common. Radiologically these changes could be due to syphilis or yaws. Few clinicians are able to define the radiological appearances of yaws. The usual changes seen were areas of rarefaction commonly starting from without.

A history of yaws was usually obtained but this is given by a large percentage of all Africans. The finding of typical tissue paper scars helps in one's final diagnosis. The Kahn test was of little value because (a) so many Africans had a positive Kahn as an incidental finding on routine examination and (b) many yaws cases have been inadequately treated in childhood.

Treatment.—The most rapid clinical cures were effected by the administration of arsenicals by injection combined with potassium iodide in doses up to 90 grains *per diem*. There was rarely radiological improvement at the time of clinical cure.

Cases of true pyogenic osteitis and periostitis were seen in a typical form.

(D) *Carpal Ganglion*.—This is a common condition in the African, the soldier usually reporting sick with a superimposed tenosynovitis. Filariasis and yaws have both been blamed for carpal ganglion but, from blood examination, smears and sections, we have obtained no confirmation of these conditions as ætiological factors. Excision is unnecessary. Seton followed by manual expression of the gelatinous fluid and immobilization for ten days proved satisfactory. In bilocular cases seton was inserted above and below the posterior carpal ligament.

(E) *Eye Conditions*.—Ophthalmic filariasis and the effects of snake venom in the eye have already been described. Other eye conditions we have met are those normally encountered in any ophthalmic out-patient department. A few are worth discussing briefly.

(i) Conjunctivitis: This is the most common condition encountered. In the Northern provinces the harmattan (a sand-laden wind which drives south from the desert) is a potent factor in the incidence of conjunctivitis. The combined effect of sun, dry wind and dust lead to a great increase in this condition, particularly among European personnel, during the harmattan season.

Irrigation and antiseptic drops were used in treatment but frequently the signs and symptoms disappeared with the use of dark glasses alone.

Among the African troops many cases of conjunctivitis were thought to be due to the instillation of irritants. These irritants varied from "native medicine", applied in all good faith, to chemical and mechanical irritants deliberately instilled or applied to cause the disability. Over-enthusiastic treatment with recognized eye drops was responsible for a few cases.

The eye showed conjunctival injection with photophobia and often lachrymation. Pus formation was seldom seen. The reasons for assuming the above aetiology were:—

(a) A history of the use of native "medicine" was often obtained after prolonged questioning.

(b) Earlier in our tour the usually accepted treatment was employed without beneficial results or effects.

(c) A number of cases showed argyrosis.

(d) Chronic cases transferred from another hospital frequently showed no symptoms when seen by us. The only residual sign was usually a bead of inspissated pus in the inner canthus or slight matting of the eyelashes. The transfer involved a three-day journey without treatment!

(e) The injection was almost always confined to, or more severe in, the lower fornices.

(f) Smears were taken in all cases. These were frequently sterile only showing debris, pus and epithelial cells.

(g) Several patients, apparently cured and having received no treatment for three or four days, on the morning of discharge showed a recurrence of their signs and symptoms. This had occurred "inexplicably" overnight. Post-operation shields were then strapped on, no further treatment given and the eye condition rapidly returned to normal. The most satisfactory results were obtained by saline irrigation and the instillation of liquid paraffin.

(ii) Trachoma: The possibility of this condition was ever present in one's mind. Very few cases were seen and none was confirmed by the finding of "inclusion bodies." Suspicious cases of follicular and granular conjunctivitis did occur but in these both upper and lower lids were affected equally and the cornea was never involved. There is no doubt that trachoma does exist on the "Coast." Evidence of resulting scarring and entropion were seen.

(iii) Clerkitis: This rather cynical word was coined to describe a type of case which is a constant source of worry to the Regimental Medical Officer. If our experience was typical almost 80 per cent of all African clerks were examined by the ophthalmologist for this condition! There is no need to worm out the history from the patient. He usually repeats a story such as this: "I am a stenographer (or clerk) and when I'm typing my eyes water and pain me and the writing becomes blurred. I have to stop and rub my eyes and I can then see for another five minutes when the same thing happens again. The condition started when I was at 'college' and has troubled me 'too much' ever since."

The visual acuity was usually about $\frac{6}{8}$ and J.12 in each eye but the wearing of the empty trial frames frequently brought about a sudden improvement and the patient could see $\frac{6}{8}$ and J.1. He desires to wear spectacles largely as a badge of class distinction.

Such patients are not really malingerers. They perform their work reasonably well and do not attempt to evade duty.

(iv) Night blindness: Although great stress is laid on this alleged condition by Company Commanders and others in charge of African troops the diagnosis is rarely justified. It was never confirmed in our experience. Admittedly our only means of estimating dark adaptability was far from perfect. A communicating door between the dark room and consultation room was opened by degrees and the patient asked to count fingers held up against a black

background at six metres. The examiner acted as control. Naturally there is an individual variation in the time of dark adaptation as is found in Europeans.

The following explanation for the apparent frequency of the condition is offered. When on night duty, the individual concerned (very often a driver) usually spends his day in a local village and reports for duty without having slept. When required he is frequently found asleep in the driving seat and later, when driving, he tends to doze and his judgment is faulty. The accompanying European reprimands him and the driver's excuse is that he cannot see well at night. Inability to concentrate owing to tiredness is thus diagnosed as "night blindness."

(v) Ear conditions : Otitis externa and otitis media were common in both European and African. The otitis externa was usually a fungus infection and was frequently followed by furunculosis. The cases of otitis media were mostly due to a recrudescence of a latent chronic otitis. Almost all the European cases occurred in people who frequented the swimming pool and the water was thought to be the source of infection. As a prophylactic measure ear plugs were advocated and in our own unit all Europeans were advised to use acriflavine and spirit ear drops on returning from swimming. All personnel with known otitis media were forbidden to swim.

III.—SURGICAL PROBLEMS IN EUROPEANS.

The surgical problems in the European can be discussed briefly. With few exceptions they are the same diseases and injuries that one meets with at home but the unfortunate victim is also subjected to the additional risks always present in a tropical climate. An attack of malaria or dysentery can render convalescence, following a simple surgical procedure, most unpleasant ! In practice these "risks of the country" were found to be almost entirely theoretical. At the back of one's mind the thought of these parasites, which lie in wait until resistance is lowered, tends to restrict one's surgical activities. There is no doubt that the majority of Europeans are less fit in West Africa than they would be in a temperate climate. This is partly due to a very abnormal environment and after a time "low fever" (probably subclinical malaria) lowers resistance and definitely prolongs convalescence.

Furunculosis is particularly common in Europeans and we are convinced that this lowered resistance is a factor. Only one stubborn case failed to improve following a full course of quinine, intravenous arsenicals and exposure to ultra-violet radiation.

Furunculosis is also caused by the larvæ of the *Tumbu fly*. The eggs are deposited on the ground and clothing laid out to dry may be infested by the emerged larvæ. Each boil has a tiny black centre—an opening through which the larvæ breathe—and the patient complains of intermittent jaggling pain in the lesion.

Treatment.—The skin was smeared with vaseline to cut off the air supply of the larvæ. The larva comes to the surface in search of air and is readily extracted. It may be as long as 12 mm. and looks like a miniature "Michelin Tyre Man."

SUMMARY.

- (1) The conditions under which the observations were made are described.
- (2) The types of operation are summarized.
- (3) Some surgical conditions peculiar to the tropics are dealt with briefly.
- (4) Additional ætiological factors which are found in West Africa have led us to describe other conditions shortly.
- (5) Problems of surgery in the European are discussed.

In conclusion we would point out that, even in Africa, "common things most commonly occur." The "newcomer" to the Coast should not be tempted to seek an obscure explanation for an everyday condition.

We wish to thank our many friends in the Colonial Medical Service for all the valuable help and advice which they so willingly offered. We also wish to thank Brigadier R. A. Hepple, our D.D.M.S. His enthusiasm and encouragement made work in a trying country seem worth while.

EXPERIENCES OF A BATTLE CASUALTY AT EL ALAMEIN.

BY CAPTAIN J. C. BISHOP, M.C.,
Royal Army Medical Corps.

THESE notes are written in the hope that they may be an encouragement to members of the R.A.M.C. by showing from personal experiences how satisfactory is the scheme for evacuation and treatment of battle casualties. They are compiled from memory some six months after the recorded events took place, so that accuracy of some of the minor details cannot be guaranteed, but I am satisfied that there are no major misstatements of facts.

As Regimental Medical Officer to a Battalion of the Royal Tank Regiment, I was returning to my unit headquarters in my Daimler Scout Car after taking two casualties to the A.D.S. a few miles west of El Alamein at 08.30 hours on November 3, 1942. I noticed about twenty Stukas in the sky and at the same time a formation of our fighters appeared so, from the security of my scout car, I settled down to enjoy a good air battle.

I saw some bombs falling and thought, from previous experience, that I was in a safe spot when suddenly my left arm went numb and I had a sharp pain in my stomach; I was not really conscious of any explosion. My driver, who had been hit in the leg and the head, noticed that the car had caught fire and so we decided to evacuate it, scrambled out and lay on the ground a few yards away. I do not know even now where the bombs fell but at least one of them must have been within a few yards of the car. Unfortunately an ammunition truck about twenty-five yards away had also caught fire and the ammunition began to explode.

I must then have had a temporary "black-out" for I received two minor flesh wounds in the foot and two in the leg though I knew nothing about them at the time (a small piece of shell case was later removed from one of them). My driver subsequently told me that "something" then hit me in the stomach and that I got up, ran about 30 yards and laid down beside another truck, though I remember nothing about this. A passing ambulance picked us up about half an hour after we were wounded. I have been told that, during the journey of about three miles to the A.D.S., I soundly cursed the ambulance driver for the rough ride; but on arriving at the A.D.S. I astonished him by thanking him profusely for the careful way he had driven!

On the way, I imagine we must have called at a R.A.P. for a Medical Officer got into the ambulance and had a look at me. I remember asking him to see what was wrong with my abdomen. He had a quick look and told me there was nothing there. I felt perfectly certain that I had an abdominal wound but, in spite of this, I asked for and obtained a drink of water from the wagon orderly; an action which earned me a severe reprimand from my driver and deservedly so! It is difficult to appreciate the overwhelming desire for a drink, even though I felt at the time that I was disregarding one of the elementary principles of First Aid and Surgery.

I made a nuisance of myself at the A.D.S. by insisting on someone examining my abdomen thoroughly to see just how much of my abdominal contents had prolapsed—to my great relief all that was found was a small second degree burn! I was immediately moved to the Resuscitation Tent and, within an hour of being wounded, was receiving two pints of whole (stored) blood. In my opinion this very early and massive transfusion is the most important advance in modern war medicine; certainly I had a very different outlook on life after I had received that blood! I was given a fairly stiff dose of morphia, I imagine, and was extremely grateful for it and plenty of "hot sweet tea"—how good it was!

When I was wounded I was wearing a fair amount of clothing—including a great-coat,

golf jacket and pullover—it had been cold that night ! Though, at the time, I was very thankful to be left in peace and not have the wound in my arm examined thoroughly, I think it was possibly a mistake, as subsequently I had to have another transfusion that evening ; presumably because I had gone on bleeding. No tourniquet was applied and I rather think no dressings.

I remained at the A.D.S. about four or five hours and then, after another injection of morphia, I was evacuated by ambulance car to the M.D.S. near Alamein Station where a surgical team was working. They were so snowed under with work, however, that I was not moved from the ambulance but sent straight on to the C.C.S. some 40 miles back.

I remember little of the journey ; the morphia had taken good effect ; but I do remember the rather grimly amusing conversation on my arrival at the C.C.S. between the wagon orderly and the orderly who met me.

The C.C.S. was of course a very temporary affair under canvas but, thanks to the attention of all, from the O.C. and Nursing Sisters downwards, was amazingly comfortable. I was taken to the operating tent within about two hours of arriving and my left arm was removed just below the shoulder by the guillotine method just about eleven hours after being wounded. I gathered that the Stuka pilot had done most of the amputation for me in the morning and that the brachial artery had been severed. No attempt was made to fashion any flaps as the surgeon was anxious to preserve as much of the short stump as possible, and he felt that they could best be made at some later date when any sepsis which might arise had been controlled. No sutures were put in. The wounds in my right foot, left leg and chest (all of them superficial) were cleaned up and not sutured.

While on the table I was given a further two pints of blood. Loath as we are to use a tourniquet, and rightly so, I think that this was a case where, if one had been used, that second two pints of blood might have been saved for someone else. On the other hand it shows how very rarely a tourniquet is really essential for I was in reasonably good condition some eleven hours after my brachial artery had been severed without any artificial aid to hæmostasis. Admittedly my condition would not have been so good had I not had that initial two pints of blood.

When I came round after my operation I felt fine and asked for a drink. I was given a large mug of tea which I drank and enjoyed but vomited immediately after !

I found my sole possessions were my tin hat, a pair of boots, my wallet containing 30 piastres (about 6s.), a pair of stretcher bearer's scissors and a prismatic compass. I was given a "Dorothy" bag containing a shaving brush, razor, soap, face flannel, toothpaste, toothbrush and some cigarettes and matches. I had no inclination to smoke the latter then or for some ten weeks later though I had been smoking quite heavily before being wounded.

I was given sulphapyridine by mouth for the next five days ; I do not know what the dosage was. During this time I suffered from severe nausea (though not much vomiting) and some headache. I do not know whether I was running a temperature but I imagine I must have been.

I was rarely in any severe pain but had a good deal of discomfort with pins and needles and occasional violent "electric shocks" in my "phantom" hand. I felt as though my hand and arm were being twisted behind my back all the time. I knew, or felt I knew, exactly the position in which my hand and arm were and I felt I could move my fingers. It was an odd experience to feel for where I was sure my hand was and to find nothing there !

The following day—about forty hours after operation—my arm was redressed. The intention was to do it under morphia and I was given half a grain ; I am afraid I must have proved very unco-operative ; it was rather painful and I had to be anæsthetized with intravenous pentothal. This had to be given through a vein in my ankle as my elbow had been "blown up" by the transfusion at the A.D.S. ; it was a delightful anæsthetic from my point of view and I did not wake afterwards for twelve hours ! The stump was dressed with sterile vaseline gauze and packed around with a good deal of wool. This wool had to be changed

twice daily for the next fortnight as there was a profuse and rather foul-smelling sero-purulent discharge.

I left the C.C.S. on the fifth day—it was being emptied and moved forwards. I was extremely sorry to go for everyone had been very kind and efficient there even though the conditions under which they were working were far from ideal.

I was moved by motor ambulance car to rail head about a mile away and there was put into an ambulance train which took us some 200 miles to a hospital in the Canal area. It took eighteen hours and was rather a miserable journey. The train always seemed to be starting and stopping with that lack of smoothness characteristic of Egyptian trains. It was impossible to think of sleeping for one was being jolted from one side of the stretcher to the other all the time and there were moans from other casualties—and probably from me as well! Eventually we arrived at our destination at about 09.30 hours. It was a General Hospital in huts. It had, I believe, been constructed in the last war.

It was very comfortable and the food was good though, at this time, I was not eating much; however we were given a bottle of beer daily which was very acceptable.

On the second day there I was told that I should be transferred to South Africa shortly and I duly appeared before a medical board which made this recommendation. My dressing was done again under pentothal about five days after the previous one. While here I was able to dispense with my evening injection of morphia; even with this I had not been sleeping much (at least I do not think I had!) but it did relieve the ever-present discomfort.

It was during the latter part of my stay in this hospital that I had my bowels opened for the first time after being wounded—I was completely constipated for eleven days! I, like most of the others, have a mild horror of the bedpan and a greater one of enemata; during the whole time no one inquired into the well-being of my bowels. On three occasions I took aperients when they were offered, the last one having the required effect. It is, I think, worth remembering that few patients will *ask* for an enema!

After six days I was again moved by ambulance train; before I left I was supplied with a pair of socks, a shirt and shorts, all too small as they could not be tried on! This time the journey was not so bad; it took about twelve hours to go seventy miles but it was during the daytime and one was able to pass part of the time in reading.

We had thought (everyone on the train was bound for South Africa) that we should be put straight on to a hospital ship but, on arrival at the port, we were sent to another General Hospital. At first I was put in a tented ward but later was moved to a hut. Here my wound was dressed twice, the first time again under pentothal when a piece of shell casing (about 2 inches by $\frac{1}{2}$ inch) was removed from a wound just below my knee. The second time, just over a fortnight after being wounded, it was dressed without an anaesthetic; I was not looking forward to it but was surprised to find how comparatively painless it was. This was the first occasion on which I saw anything of the stump myself and I was amazed to see how clean and healthy it was and how quickly the skin was being drawn in over the raw area.

While at this hospital I was put on another course of sulphapyridine but this time the only unpleasant feature was an increased anorexia.

Most of us in hospital were awaiting evacuation to South Africa and we were all impressed with the care and trouble taken by the Quartermaster and his staff to rescue kit which we had left in various depots throughout Egypt. My own arrived the day before we embarked. It was a not uncommon experience in my unit for officers and O.R.s to lose their kit on their way to, or during their stay in, hospital. It was, therefore, most encouraging to see the trouble that was taken with mine.

One criticism I have to make of this hospital and that is of the difficulty of getting hold of an orderly in the night to bring a "bottle"! On one night in particular I spent a very uncomfortable four hours calling out at frequent intervals and in no uncertain terms for an orderly—but in vain.

I was eventually put on board a hospital ship and sailed for South Africa. It was a delightful trip, there was plenty of room, good food and no necessity for a rigid black-out. I had my

wounds dressed every four to five days with very little discomfort. I developed a cellulitis around one of the wounds of my leg but it quickly subsided with conservative treatment. I had a blood-count done which showed (I am speaking from memory) 55 per cent hæmoglobin and 2.5 million red cells. I was put on intramuscular Campolon and the noticeable feature was the way in which my appetite immediately improved.

After a few days on board I was allowed to get up and sit out on the deck in my pyjamas. I had my lunch and tea on deck and the whole atmosphere was reminiscent of a peace-time holiday cruise.

On the day we disembarked I got dressed for the first time and walked off the ship under my own power. We got on to another hospital train at the docks and immediately tea, sandwiches, chocolate and cigarettes were pressed upon us. This was a foretaste of the almost unbelievable hospitality that South Africa shows to troops passing through. We travelled up about 60 miles, climbing 3,000 feet, through delightful scenery, with green trees and grass and streams such as we had not seen for some time.

When we arrived at our destination, a representative of the hospital came and gave us chits (while we were still in the train) telling us to which wards we were to go. The only other officer in my compartment happened to be a psychological case and I was rather surprised, therefore, to find that we were both to go to the same ward. When I got there I found that it was a neurosis ward! I made a mild protest but was told that nothing could be done until the morning. I had rather an uneasy night. After breakfast the following morning the psychiatrist happened to see me and asked me if I had any dressings as he had better see them. While he was doing this I asked if I could be transferred from this ward. He asked me why and I had considerable difficulty in explaining that I was in no need of psychological treatment. It was not until he had confirmed my story from my documents that I was transferred!

At this hospital they were great believers in exposing granulating surfaces to the fresh air and sunlight. I did this for about two hours, afterwards having the stump dressed with sulphanilamide powder. It certainly seemed to work very well though they were rather extravagant in the amount of sulphanilamide used for each wound.

Patients here were encouraged to go out into the country and stay on farms when it could be arranged. I was lucky enough to be asked out to a farm for Christmas week and the hospitality I received there was something I shall never forget. I went there again just before I left the country and, in addition to magnificent food, fresh fruit and milk, I was able to go riding, play cricket on the lawn and swim in the swimming pool in the garden. And this was not an isolated experience; most of us had similar ones. I was actually on the farm when I was recalled to catch a boat back to England.

This time it was not a hospital ship but a North Atlantic liner fitted out as a troopship and there was consequently not the same space available that we had enjoyed before and it was rather hot and uncomfortable in the tropics. By the time I left South Africa, less than three months after being wounded, I was able to discard all my dressings.

When we arrived at a port in the United Kingdom we were told we all had to go to hospital: an instruction which did not meet with whole-hearted approval as we foresaw a period of several days doing nothing. However we arrived at a General Hospital and, within less than twenty-four hours, we had all had our histories taken, been examined, had our photographs recorded, been issued with identity cards, ration cards and railway warrants and despatched on leave—a triumph of organization!

Now I have a painless stump, even though the scar is adherent to the bone at one point. I am, of course, still conscious of a "phantom" hand, but this causes no real discomfort. I have been fitted for, and shall be issued with, an artificial limb by the Ministry of Pensions. It is surprising how quickly one accommodates oneself to loss of a limb; it has been said that one arm is a necessity but two are a luxury!—I am entirely in agreement with the second part of the statement and have no wish to disprove the first part.

It only remains to summarize the lessons which may possibly be learnt from my experiences.

- (1) The necessity of carefully examining wounds at the earliest possible moment.
- (2) A further demonstration of how rarely a tourniquet is really essential.
- (3) The necessity for all who have anything to do with a patient to be very careful what they say in his hearing.
- (4) The advisability of inquiring into the action of a patient's bowels daily and of recording such inquiry.
- (5) The necessity for a hospital orderly to be at least within calling distance at all times.
- (6) The great importance of taking every care to see that a patient's kit is not lost ; rightly or wrongly the loss will be blamed on the R.A.M.C.
- (7) A further demonstration of the excellent results that can follow a simple guillotine amputation.

I am very grateful to Lieutenant-Colonel G. P. Crowden, *T.D.*, R.A.M.C., for helpful criticism and suggestions in writing these notes.



Editorial.

THE OFFICER, R.A.M.C.

IF one can say that any pleasure at all can be derived from war, then it may be said that one of the pleasures of such a catastrophe is the chance given for the regular R.A.M.C. officer and his brother in civil life to meet and exchange views and ideas. One often feels that, in peace time, contact between the two is all too short and infrequent, consequently a barrier tends to grow up between them ; not a high barrier it is hoped but a barrier nevertheless. On the one side the civil medical man tends to regard the regular officers as doctors who have given up medicine in favour of globe-trotting combined with plenty of sport while the Corps officer tends to look upon the civilian opposite number as a fixture with no spirit of adventure.

That neither of these ideas is right goes without saying but it must also be admitted that there is a grain of reason in both and the choice taken by the recently qualified doctor depends mainly on his tastes and personal predilections.

The young doctor enters into civil practice for a variety of reasons : an ambition to specialize, to follow in his father's or other relative's practice, a liking for the spirit and conditions of civil practice, etc.

The young man who goes to the R.A.M.C. goes for as great a variety of reasons : to see the world, to gain experience in tropical medicine, because he thinks it is a good life, for the pension when he retires ; but whatever the reason the ambition to continue medicine is one.

The war, then, has brought together medical officers with entirely different points of view, aspirations, modes of life and ideas ; the officer and the civilian, the consultant and the general practitioner, the M.O.H. and the research worker ; and it is believed that each is learning something from the other. The consultant is human after all, the research worker has not got his head in the clouds all the time, the general practitioner has a store of common sense and practical experience, possessed by few, while the regular officer does know a great deal of medicine and does not live entirely on past events in Poona.

If we consider the difference in outlook between the Army medical officer and the civil doctor we find that the latter on entrance into the Service has to make many adjustments to his previous ideas. The first and most obvious is that the doctor-patient relationship is altered ; no longer is the patient exactly a personal friend ; he now becomes a member of an immense organization and, while some medical officers are fortunate enough to remain for a sufficiently long time with one unit and to regard the individual soldier as patient and friend, unfortunately, in the fifth year of the war, the great majority of doctors move from unit to unit regularly and quickly. Incidentally this is not arranged by the vagaries of the higher formations but by a very real need to economize in medical man power. Thus, through no fault on either side, the old relationship between doctor and patient is lost.

The next adjustment of outlook that has to be made by the newly-joined medical officer is the stress laid, in the Services, on prevention rather than cure. Paragraph 7 of Regulations for the Medical Services of the Army lays down in order of priority first, the prevention of disease and, secondly, the care and treatment of the sick and wounded. This is a completely new aspect of medical practice to most medical men. Rightly or wrongly most emphasis is laid, both in hospital training and in practice, on the treatment of sick people. Our present National Medical Organization, apart from the Ministry of Health and its local representatives,

does not markedly emphasize the prevention of sickness. But here is the primary duty that is laid upon us—the prevention of disease—which is only another way of saying economy in man power in all its aspects. In our experience this is the greatest stumbling-block which the recently-joined officer has to face. One frequently hears complaints that no clinical work is available. That may be so, but it is often available if it is sought for and, while one has every sympathy for the officer who wishes to keep in touch with medicine to prepare himself for his return to civil life, yet this is a total war and unless we play our part to the best of our ability there will be no “after the war” for us. It is just as important, and certainly our main task, to prevent disease and economize in men as to treat disease.

The second clause of our charter in the Royal Army Medical Corps is the treatment of the sick and wounded. Here the regular officer and the war-time officer meet on common ground and here again some difference between Army and civil practice may be noted. The chief object in the Service is to get the soldier fit and back to his job at the earliest possible moment consistent with the man's own welfare. This proviso is very important as in the Army the soldier draws his full pay while he is sick in comparison with the civil patient who often has to forfeit his pay for the time he is absent. Another difference is that the soldier can be sent to convalescent homes and depots which means that he is a fit man before he returns to his unit. This, again, is a comparison with his civil brother who is often forced by economic circumstances to resume work at the earliest possible moment; but as against this we must point out the fact that while the civilian may possibly be able to carry on at his work in spite of not being 100 per cent fit, the soldier must return to his unit ready to do his work at once.

These considerations influence the military medical officer to a large extent in his choice of treatment for individuals. It has this advantage: that economic conditions are completely banished from the picture and what is best for the patient is the only point we need take into account.

Another fact which often surprises newly-joined officers is the seemingly trivial disabilities for which soldiers are admitted to hospital. The reason for this is perfectly obvious—the civilian can usually get some nursing and attention to diet in his home even though it may be of the most elementary kind. But the soldier cannot; he cannot remain in his billet or barrack room for more than a few hours or it would prove a disturbing element to his comrades while, even if he could, no proper messing arrangements could be made either for service or for the type of meal he may require.

In active service conditions the first noticeable change in professional attention is that in the forward areas the R.M.O.'s main function is first aid. In contradistinction to civilian practice, when he may have had charge of the case from the first to the last, he now patches up the patient to the best of his ability and then loses sight of him; a thing which distresses the medical officer considerably. Any doctor likes to see the progress of a case under his treatment, to follow it up, to observe its changes and to learn more of his art.

This difficulty seems unavoidable. It is impossible for the R.M.O. with a unit in the front line to see his cases in the Base Hospital and, for the sake of the sick or wounded man, we must recognize that follow-ups in person can only be done at the expense of the patient.

In other directions, too, does the emergency medical officer find that Service conditions are strange—in public health work new problems meet the former M.O.H. Hygiene in the Army embraces subjects which are not dealt with in civil life, for example clothing, training and prevention of tropical disease.

The ever-present suspicion in the Army that a man may be malingering is one of the ideas which has been instilled by custom into all new-comers. This is largely a myth. Men do sometimes make the most of their ailments but, on the whole, malingering in the Army nowadays is rare and very few cases are met with in the course of years of Army sick parades.

Recent Army Council Instructions have produced a great change in the character of sick parades. In future they will be more on the lines of clinics rather than parades and the

atmosphere to be encouraged will be that of the family doctor of civil life. This is a distinct advance and one which will be welcomed both by the soldier and by the medical officer as it will fall into line with the usual experiences of both.

So do the regular officers, the T.A. officers and the Emergency officers meet on common ground during a war. How, then, shall we continue to foster this exchange of outlook after the war is over? There is no doubt that the present generation of doctors will continue to retain their sympathy with their colleagues in other branches of the profession but we hope not to have to rely on a periodical war to enable an understanding to be attained.

Possibly national conscription will remain after the war when, presumably, doctors will have to perform their period of service. Perhaps the Territorial Army will attract doctors in greater numbers than before the war, perhaps the regular officers may have more chances of taking part in civilian practice, using that term in the widest sense.

Whatever happens, and it is useless to prophecy at this stage, we should all, as doctors, military or civil, ensure that greater understanding and knowledge of the other one's job obtains and that the gulf formerly appearing between the two is bridged.



Clinical and Other Notes.

CORNEAL VASCULARITY AS A SIGN OF ARIBOFLAVINOSIS.

BY MAJOR J. GRAHAM SCOTT, B.Sc., M.D.GLAS., D.O.M.S.,

Royal Army Medical Corps.

IN 1938-39 Sebrell and Butler first described the syndrome due to deficiency of vitamin B₂ (riboflavine), characterized by undue redness of the buccal mucous membrane of the angles of the mouth, by softening of the skin and subsequent fissuring at those angles and by reddening, fissuring, and desquamation of the vermillion area of the lips. Seborrhœic lesions of the nose, eyelids and ears were frequent.

This was confirmed by Sydenstricker *et alia* (1939).

Kruse, Sydenstricker, Sebrell and Cleckey (1940) added a specific glossitis, circumcorneal injection, conjunctival congestion and keratitis.

Vascularization of the cornea had been described in ariboflavinosis in rats by Bessey and Wolbach (1939).

Gross (1941) summarized the syndrome under five heads, viz., (1) cheilosis ; (2) perleche ; (3) seborrhœa of face ; (4) vascular cornea ; (5) keratitis.

Wiehl and Kruse (1941) examined 500 poorer class children and 300 better class, finding 75 per cent and 2 per cent respectively with vascular cornea.

Duckworth (1942) reported two cases without eye signs and suggested that 3 mg. riboflavine was an adequate daily intake.

Kodicek and Yudkin (1942) examined 496 children by slit lamp and found 4 per cent with actual invasion of cornea which they accepted as a sign of ariboflavinosis. Scarborough (1942), who agreed that all the above signs have been resolved by riboflavine, found that circumcorneal vascularity was present in 34 per cent of 204 unselected cases.

In eight affected cases riboflavine exercised no beneficial effects. Sydenstricker confirmed that the vascularity differed in no material way from that in frank ariboflavinosis.

Scarborough concluded that corneal vascularity *per se* cannot be regarded as a sign of ariboflavinosis and that the result of a therapeutic test is the best criterion.

A high incidence of corneal vascularity was noted among Europeans in the Gambia, British West Africa, and the following investigations were carried out.

400 Europeans and 300 Africans were examined with binocular loupe and focal illumination.

Corneal vascularity was found in 35 per cent Europeans and in 5 per cent Africans. This examination was part of an investigation of the nutritional condition of Europeans and Africans undertaken by Brigadier Findlay, Lieutenant-Colonel McComas, Majors Murray Lyon, Syms and Graham Scott, when a medical history was taken and medical, dental and ocular examinations were carried out.

EUROPEANS.

The Europeans were divided into two groups, the first 100 having less than two months in the colony and the remainder 300 more than one year.

The percentage results are summarized in the table below.

			B ₂ mouth lesions	Corneal vascularity
100 New residents	..	..	0	24
300 Old residents	..	..	24	38

The mouth lesions were one or other of perleche, cheilosis or glossitis. It was concluded that the old residents developed some ariboflavinosis (as judged by mouth signs) but it was

doubtful whether the vascularity was due to the same cause or was similar to that described by Scarborough and not due to lack of B₂.

Among the 300 old residents, it was found that those with mouth lesions had no higher incidence of vascular cornea than the average, which suggested that the vascularity was not associated with the mouth signs.

Further analysis showed no relationship of vascular cornea with past illness or with recent illness, such as malaria.

AFRICANS.

The percentage results from the 300 Africans are tabled below.

				Mouth lesions	Corneal vascularity
200 soldiers	..	..	..	36	4.5
50 labourers	..	..	..	96	8.0
50 children	..	..	..	72	4.0

This low percentage of corneal vascularity is in agreement with a series of 600 African soldiers and 800 African school children examined by the author. The contrast between the 5 per cent native corneal vascularity and the 35 per cent European vascularity is all the more striking when it is remembered that the native shows double the number characteristic of European cases with other signs of B₂ deficiency and that a few cases of mild trachoma may be included amongst the Africans.

The 1,700 natives examined all presented a ring of pigment round the cornea. Old channels in the pigmented area gave evidence of past vascularity. It is certain however that corneal vascularity does not give a reliable index of lack of vitamin B₂ in the Africans.

THERAPEUTIC TEST.

To determine the value of corneal vascularity as a test for avitaminosis in Europeans, a further 136 Europeans were examined by slit lamp.

The vascularity was recorded in one of the following grades :—

0 = no circumcorneal injection.

1 = a few circumcorneal vessels.

2 = many circumcorneal vessels.

3 = invasion of the clear cornea with not more than one arcade of anastomosing invading vessels.

4 = more than one arcade.

Grades 0 and 1 were regarded as " Normal " while 2, 3, and 4 were regarded as " Vascular cornea."

54 per cent of the cases were normal and 46 per cent has vascularity.

The figures for the five grades were as follows :—

Grade	..	0	1	2	3	4
Numbers	..	26	47	3	54	6

It was found that many cases with invasion of the clear cornea had a 0 or 1 grade of circumcorneal injection.

Captain J. W. Byrne, R.A.M.C., using binocular loupe and focal illumination, confirmed these figures but obtained slightly lower numbers in grade 3. Half of each group, i.e. normal and vascular, volunteered to take 6 mg. riboflavine daily for twelve days.

Any change from one grade to another was recorded. The results were as follows :—

	Improved	I.S.Q.	Worsened
70 taking riboflavine ..	13	81	6
50 Controls	12	82	6

It is seen that there was a tendency for the degree of vascularity to vary, and that riboflavine had no influence on this variation.

Twenty of grade 3 vascularity continued 6 mg. riboflavine for a further week without improvement and six men continued for yet another week without improvement.

On the same dose, six Africans were cleared of mouth signs of ariboflavinosis in seven days but corneal vascularity was unaffected after three weeks treatment.

As this therapeutic test failed to improve the condition in Europeans it is concluded that the corneal vascularity found in the Gambia is not due to ariboflavinosis.

SUMMARY AND CONCLUSIONS.

(1) In 536 Europeans, 37 per cent had corneal vascularity. In 1,700 Africans, 5 per cent had corneal vascularity.

(2) Judged by perleche, cheilosis and glossitis, the Africans had double the European numbers of ariboflavinosis.

(3) Therefore corneal vascularity cannot be taken as a guide to avitaminosis in the African.

(4) 136 Europeans were examined by slit lamp. 70 took a course of riboflavine while 50 acted as controls. This therapeutic test was negative.

(5) The degree of vascularity fluctuates with or without riboflavine.

(6) Therefore corneal vascularity cannot be taken as a guide to avitaminosis in Europeans.

(7) All the Africans examined had a rim of pigment at the corneo-scleral junction.

(8) It is possible that this rim of protective pigment explains the striking difference in African and European corneal vascularity.

My thanks are due to Brigadier G. M. Findlay for permission to forward his figures. I am further indebted both to Brigadier Findlay and to Colonel R. G. Gordon, O.C. — General Hospital for their helpful encouragement in this investigation.

REFERENCES.

- BESSEY, O. A., and WOLBACH, S. B. (1939). *J. exp. Med.*, **69**, 1.
 DUCKWORTH, G. (1942). *Brit. Med. J.*, No. 4244, p. 582.
 GROSS, P. (1941). *Arch. Derm. Syph., Chicago*, **43**, 505.
 KRUSE, H. D., SYDENSTRICKER, V. P., SEBRELL, W. H., and CLECKLEY, H. M. (1940). *Publ. Hlth. Rep., Wash.*, **55**, 157.
 KODICEK, J. H., and YUDKIN, J. (1942). *Lancet*, No. 6226, 753.
 SCARBOROUGH, H. (1942). *Brit. Med. J.*, No. 4272, 601.
 SEBRELL, W. H., and BUTLER, R. (1938). *Publ. Hlth. Rep., Wash.*, **53**, 2282.
Idem (1939). *Ibid.*, **54**, 2121.
 SYDENSTRICKER, V. P., GESSLIN, L. E., TEMPLETON, C. M., and WEAVER, J. W. (1939). *J. Amer. Med. Ass.*, **113**, 1697.
 SYDENSTRICKER, V. P., SEBRELL, W. H., CLECKLEY, H. M., and KRUSE, H. D. (1940). *Ibid.*, **114**, 2437.
 WIEHL, D. G., and KRUSE, H. D. (1941). *Milbank mem. Fd. quart. Bull.*, **19**, 241.

ECONOMY IN THE USE OF COCAINE.

BY MOFFETT'S METHOD OF POSTURAL INSTILLATION.

BY MAJOR L. T. CLARKE,

Royal Army Medical Corps.

IN the December, 1941, edition of the *Journal of Laryngology and Otology*, Major A. J. Moffett, R.A.M.C., described a new method for securing local anæsthesia for intranasal operations. He called his method Postural Instillation and the name is an indication of the technique.

The present writer had the good fortune to be the anæsthetic specialist to the same general hospital unit during the experimental period prior to the publication of Moffett's results. In assisting Major Moffett he also designed the special needle employed in the technique.

Most anæsthetists will agree that the majority of intranasal operations are better performed under local anæsthesia than under general. This statement is even more acceptable to E.N.T. Surgeons. With proper safeguards the ideal drug is, *par excellence*, cocaine hydrochloride.

Before the introduction of Postural Instillation there were three methods of producing local anæsthesia in the nose: (1) by spraying the interior of the nose with cocaine solution; (2) by packing the nasal cavity with ribbon gauze soaked in cocaine solution; (3) by blocking the nerves as they entered the nose. For this purpose probes loaded with pledgets of wool soaked in anæsthetic solution were strategically placed in the nose.

All three methods had certain disadvantages in common. They all involved the use of potent solutions, often of 20 per cent strength. The total dosage of cocaine was not accurately controlled—it was largely empirical. All three methods failed or were only partially successful in the grosser pathological states in the nose. Success depended upon access and, in conditions producing blockage of the nose, such as the extreme degrees of septal deformity or in multiple polyposis, access was impossible. In such cases local anaesthesia had to be abandoned in favour of general anaesthesia. Further in all three methods there was a tendency to use more cocaine than the actual anaesthesia demanded; the excess trickled in to the nasopharynx and was swallowed. Without doubt some of the symptoms of undue cocaine absorption were due to absorption from the gastric mucosa. Apart from this aspect, these methods were wasteful of a valuable drug—one that is increasingly valuable in time of war. The economical virtue of Postural Instillation is marked and the demonstration of this virtue is the purpose of, and excuse for, this paper. When Moffett sought his ideal method he was actuated by two desires, the complete safety of the patient and the entire success of the anaesthetic from the surgeon's standpoint. Economy was an ancillary virtue but, surely, in wartime a cardinal one.

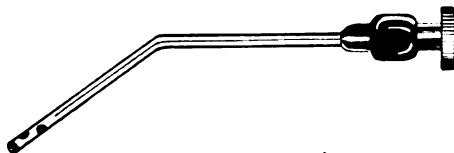
Experiments were made to determine the amount of fluid which the nose can contain without overflow into the nasopharynx. The average maximum amount was 90 minims. Various strengths of solution of cocaine were tried and finally a 3 per cent solution in 0.5 per cent sod. bicarb. was adopted. The sodi bic. increases the permeability of the solution. In our practice all cocaine solutions were coloured to avoid the danger of their confusion with innocuous solutions.

In describing the technique the writer is quoting Moffett's original article in Volume lvi. No. 12, of the *Journal of Laryngology and Otology*, published in December, 1941, to which the reader is referred.

"To induce an anaesthesia the technique is as follows:—The vibrissæ around the nostrils are clipped and the patient given a hypodermic injection of morphine tartrate $\frac{1}{4}$ grain one hour before induction."

The Anaesthetic Mixture.—"For adult males 60 minims of a 3 per cent solution of cocaine hydrochloride in 0.5 per cent solution of sod. bicarb. is ample in all but the largest intranasal proceedings. (The minimum amount used so far has been 40 minims, the maximum 80 minims.) To this quantity of solution is added one-quarter its volume of 1:1,000 adrenaline hydrochloride."

Position.—"The patient is placed in the Lateral Head Low position described by Sidney Pankinson, thus . . . , seated upon a cot and beside him are placed one or more pillows. He is then bent down laterally, so that his shoulder rests on the far edge of the pillow. The shoulder and the pillows together act as a fulcrum. The head is now bent downwards so as to be inverted in a strictly lateral position. The extent of inversion of the head will necessarily vary with the flexibility of the patient but 45° is probably adequate. The important fact is that whatever the degree of inversion the cribriform plate marking the nasal roof is always dependant and level in this position." Placed thus the patient is quite comfortable but, for anaesthetic purposes, he is lying, not sitting, on the couch or bed.



Method of Instillation.—"About $\frac{1}{3}$ (one-third) of the anaesthetic mixture is drawn into a 2 c.c. hypodermic syringe to which is attached a blunt solid-ended, angled, needle about 2 inches long and with lateral holes of the type illustrated.

"The blunt end prevents accidental penetration of the nasal mucous membrane and consequent injection of the mixture into it."

Note.—The “Clarke needle” is easily manufactured by any intelligent O.R.A. from the record needles at present issued. The needle is bent to an angle of 45° , its end is sealed with a blob of solder, and several lateral holes are cut with an ampoule file.

“The nares are now cleansed with spirit. Two or three minims of the mixture are dropped on to the septum and into the little hollow formed by the nasal vestibule on the lower side. The nostrils are then gently squeezed against the septum, so that the cocaine solution is pressed on to the mucous membrane of the septum, care being taken that none is squeezed out on to the face. Half the mixture remaining in the syringe is then instilled into each nostril, keeping the needle as close to the floor of the nose as possible. This is facilitated by the angle of the needle. The time is noted and the patient allowed to remain in this position for ten minutes. At the end of that period another third of the mixture is instilled in a similar manner, and the patient is instructed to pinch his nostrils firmly to prevent the solution running out and then roll over on to his face without raising his head, which is now supported in a level position by a pillow under his face. After ten minutes in this position the patient, still pinching his nostrils, resumes the lateral head low position, this time upon the right side, and the remainder of the cocaine is instilled into the nostrils. A few sniffs with the nostrils pinched while in this position exhaust some of the air from the sinuses and allow small quantities of the solution to enter. This position is also maintained for ten minutes. At the end of this time the patient lies upon his back. Any unabsorbed solution falls to the back of the nasal fossæ and completes the anæsthesia in that region. For submucous resection of the septum a small quantity of 1 per cent procaine with 4 minims of 1 : 1,000 sol. of adrenaline hydrochloride to the ounce is injected into the columella and anterior part of the floor of the nose.”

Such is the technique described in Moffett's own words. At first blush an obvious criticism is that the method is time-consuming; a single induction takes half an hour. This can be answered in two ways. First it is common knowledge that the failures in local anæsthesia are frequently due to unseemly haste and therefore the time element is a factor of success. Secondly in a busy operating list the second case is induced during the operating period of the first case and, at the end of the list, the loss of time is still only the initial first half-hour.

The method has been used for operation on all degrees of deviated septum, for extreme nasal polyposis, partial ethmoidectomy, endonasal antrostomy and opening of the sphenoidal sinus. Over a period of many months the method has justified itself in the hands of different surgeons and in the eyes of at least one anæsthetist, the present writer. Furthermore another aspect has emerged, the striking economy in the use of cocaine hydrochloride. The extent of this economy can be gauged from the following report on the cocaine consumption in the writer's present hospital.

Prior to the introduction of Postural Instillation a standard 20 per cent solution of cocaine hydrochloride was used for the various procedures in the E.N.T. operating theatre, the out-patient department and the wards. To obtain a balanced view of consumption a period of six months was taken—from September, 1941, to January, 1942, inclusive. In that period the consumption of cocaine hydrochloride was 1,000 grains.

After the introduction of the new method it was still necessary to use the 20 per cent solution for all out-patient work and therefore any economy observed was due to the introduction of Postural Instillation for operative work. For comparison a similar period of time was taken—from September, 1942, until January, 1943, inclusive. In that period the consumption of cocaine hydrochloride was 498·5 grains.

Thus in one hospital alone an annual saving of 1,000 grains of cocaine hydrochloride is effected by the adoption of this method. The writer suggests that the method recommends itself to the war economy of all military hospitals.

Liberal quotation has been made from the original article in the *Journal of Laryngology and Otology*, and the writer offers grateful acknowledgment to the Editor who gave his ready permission.

THE BIOCHEMISTRY OF ADDISON'S DISEASE.

BY LIEUTENANT GRENVILLE MATHERS, M.A., M.Sc., M.B., B.CHIR.CANTAB.,
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Royal Army Medical Corps.

THOMAS ADDISON of Guy's Hospital first described this disease which bears his name. It is a disease found in all races throughout the world characterized by pigmentation of the skin and mucous membranes, myasthenia, subnormal temperature and blood-pressure and gastro-intestinal upset. In nearly all cases a lesion of the suprarenal gland has been found. In cases where the suprarenal has been found healthy, damage to the celiac plexus has always been present. The majority of cases are due to tuberculosis while others are due to secondary deposits of carcinoma, hæmorrhage or simple atrophy of the gland.

Until recently the disease was fatal within five years but, with the advances in hormone research, the treatment is more firmly based on reality and the outlook correspondingly improved.

That Addison's disease is primarily a defect of salt metabolism has been firmly held for many years and McCance was able to show that the symptoms and signs of experimental salt deficiency in man were strongly suggestive of Addison's disease. It is now possible in addition, in the light of modern findings in pure biochemistry, to adduce explanations for most of the changes which occur. All these changes, many of them up to now isolated facts, can be attributed to destruction of the suprarenal gland tissue.

Firstly the discoloration of the skin. This is characteristic. It is deepest on the areas exposed to light, friction and pressure and on the mucous membranes of the mouth, anus and vulva. This pigment is an excess of the normal melanin found in the skin, retina and hair. Raper has shown that melanin is formed by oxidation of the essential amino acid tyrosine by the enzyme tyrosinase present in the cells of the rete malpighii of the skin. By the action of this enzyme tyrosine is converted into dihydroxy indole and then into its carboxylic acid. This compound is red and polymerizes spontaneously into the black pigment melanin.

Tyrosine, or rather its desoxy compound, is also the precursor of adrenalin which we know is produced by the medulla of the suprarenal gland. With the destruction of this gland the production of adrenalin is reduced—thus accounting for the hypotension—and an excess of tyrosine is present in the body. This excess of tyrosine is then changed into melanin by the tyrosinase of the rete malpighii thus producing the pigmentation of Addison's disease.

Myasthenia is present in the majority of cases and has been difficult to explain. The muscular fatigue is like that found in myasthenia gravis. The contractions are, at first, of average power but fatigue soon develops. On resting the muscle power returns. This can now be correlated with the biochemical changes. The cortex of the suprarenal controls the water and salt metabolism of the body. When the gland is removed the excretion of sodium is increased and in consequence the sodium chloride and bicarbonate level of the plasma is reduced. To maintain the ionic equilibrium the plasma potassium rises to counterbalance the fall in sodium. In Addison's disease this ionic change also occurs. The serum sodium and chloride fall from the normal 350 mgm. per cent and 325 mgm. per cent respectively and the potassium rises from 20 to 25 mgm. per cent. So constant is this change that it is of diagnostic importance.

It is this ionic change which is responsible for the myasthenia. Muscle contractility and power is dependent upon the presence of calcium ions and is counter affected by potassium ions. Thus as the potassium level rises in the disease so the myasthenia increases.

Coincident with this myasthenia creatinuria occurs. Creatine is of endogenous origin and is only excreted in the urine before puberty and in women during pregnancy. In adults creatine is excreted in the form of its anhydride creatinine and this excretion per day is constant for the individual. Now the chief function of creatine is to form phosphagen which acts

as the phosphate reservoir for muscular contraction. Hence this creatinuria in Addison's disease is a consequence of the muscle atrophy. This creatinuria can be made use of in measuring the progress of the disease. This is directly comparable to the ratio of creatine to creatinine excretion.

The ionic changes in the plasma are also responsible for the well known biochemical finding—a rise in the blood urea level. As a result of the lowered electrolyte content of the plasma water is lost in order to maintain the osmotic equilibrium. In consequence the blood becomes more concentrated and its volume reduced. This accounts for the readings for blood urea estimations being increased and this may be aggravated by the gastro-intestinal disturbance which is sometimes present.

Not only is the suprarenal associated with water and salt metabolism but it has been shown that the gland influences the phosphorylation of carbohydrate in the intestine. Through this mechanism the suprarenal maintains the level of the blood sugar and the liver glycogen. When the gland is destroyed therefore the absorption of carbohydrate is reduced and hypoglycæmia occurs. This activity of the suprarenal gland has not been well worked out yet but that it is important is manifest during treatment. Even though the levels of blood sodium, potassium and urea are normal there is little improvement in the patient's well being unless the fasting blood sugar is over 60 mgm. per cent.

So far the suprarenal gland alone has been considered but as with all endocrine disorders more than one gland may be involved. Thus at autopsy the testes and ovaries are atrophied and the pituitary is found to contain fewer basophil cells than normal. The disease is not primarily one of pituitary origin however although Langdon Brown emphasized the pre-eminence of the pituitary in endocrinology by calling it "the leader of the endocrine orchestra." The basophil cells are reduced owing to the absence or diminution of the suprarenal hormone. This change in the basophil cells is associated with reduction in the basal metabolic rate and body weight just as this occurs in Simmond's disease which bears some similarity to Addison's disease and is caused by destruction of the pituitary gland.

Treatment.—It must be borne in mind that unless Addison's disease is due to simple atrophy of the gland we are dealing with more than just a hormone deficiency and that the body has another pathology to deal with in addition.

The aim of treatment is to keep the blood sodium normal, to prevent the blood urea and potassium rising and to keep the fasting blood sugar above 60 mgm. per cent.

The administration of sodium salts enormously benefits patients. About 15 grammes per day are needed preferably administered in capsules to avoid the emetic effect. The sodium may be given solely as the chloride, or since the chloride level of the blood automatically increases with the sodium level, a mixture of the citrate, phosphate and bicarbonate may be given. This is less likely to produce emesis.

For the hormone deficiency itself dried whole suprarenal gland may be given. This is beneficial provided it is given in large enough doses since only a small percentage of the active principle is absorbed.

Extracts of the gland are obtainable. The activity of the extracts is associated with the lipid fraction and from this numerous ketones and alcohols have been isolated, several of which have some activity. The most active is corticosterone which is a sterol derivative. This compound not only controls the salt metabolism but also influences the carbohydrate metabolism. It does not represent the full activity of the gland since more potent non-crystalline fractions of the gland have been obtained. Corticosterone is expensive and so this is best used for treating the crises which are such a feature of this disease. Up to 50 c.c. even intravenously may be required every six hours. If used for maintenance up to 20 c.c. daily may be needed and this is best given intramuscularly.

Because of its expense many attempts to synthesize corticosterone have been made. So far these attempts have failed but a compound closely related to corticosterone has been obtained. This is desoxycorticosterone acetate, known usually as D.O.C.A. This can be made fairly easily but unfortunately it does not control all the manifestations of the disease.

It is given intramuscularly in oily solution and so has a more prolonged action than corticosterone. This precludes its use during the crises. 5 mgm. are approximately equal to 10 c.c. of cortin. If necessary 50 mgm. tablets can be implanted subcutaneously in the abdominal wall. These exert their effect up to three months after implantation.

The simplest index of good treatment once the patient is stabilized is his weight. If this falls then injections of the extract must be started or increased and the salt intake increased.

So far therefore the treatment of Addison's disease with glandular extracts has not reached the same stage as the treatment of diabetes mellitus with insulin. Much progress has been made but our treatment is still only partially successful.

RESUSCITATION IN THE FIELD.

[The following article describes an ingenious method of applying heat in cases of shock. The apparatus was devised by R.S.M. Saxon of 203 Field Ambulance and has the advantage of providing a more even distribution of heat over the body surface. It should, however, be borne in mind that over-efficiency in heat production may have a deleterious effect, as pointed out in Item 163 of A.M.D. Bulletin, No. 22. Care must therefore be exercised in the use of all such appliances.

It is suggested that the apparatus could be made more readily portable by soldering to the openings of the petrol tins collars of such a size that the funnels can be slipped off for packing.—Ed.]

[The object in view when constructing the "Saxonfone" was to distribute in a more even manner the hot air rising from the heating unit under the resuscitation bed.

The graph indicates that when the heating unit is placed under the resuscitation bed

CHART SHOWING TEMPERATURE
COMPARISONS AT CENTRE OF
STRETCHER.

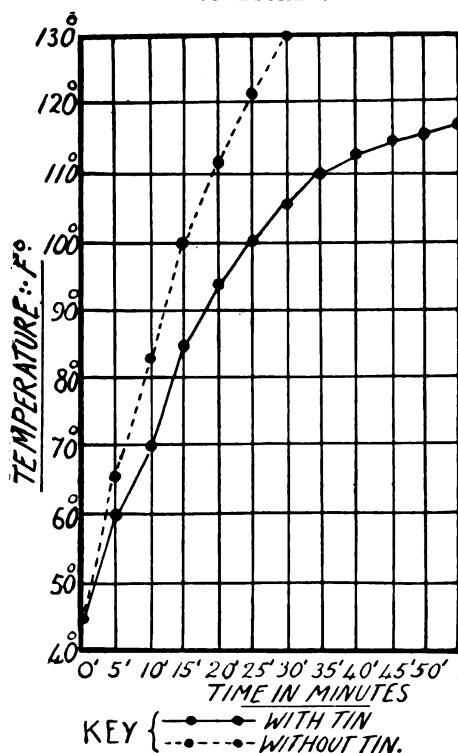
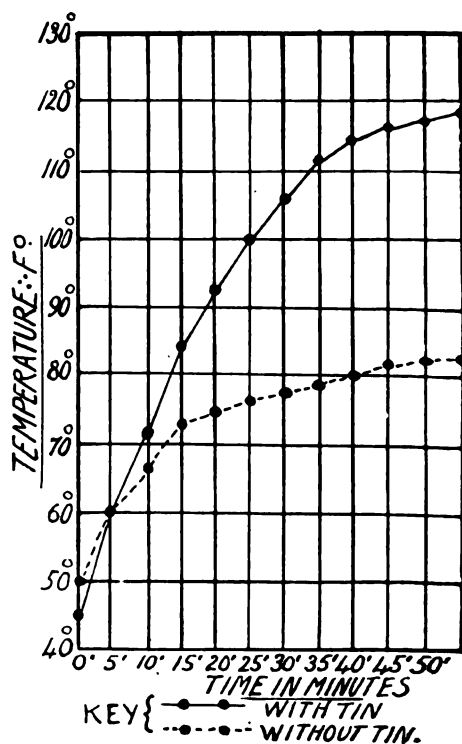


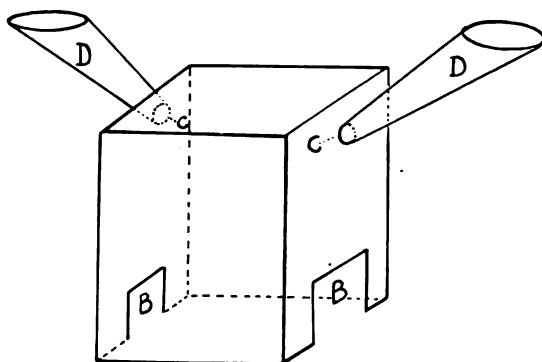
CHART SHOWING TEMPERATURE
COMPARISONS AT ENDS OF
STRETCHER.



without any form of baffling then the centre of the bed is rapidly heated to a temperature in excess of what is most beneficial ; while the baffling apparatus spreads the warm air so that the rise in temperature is more slowly (and therefore more beneficially) created. A graph to indicate the temperatures at the ends of the bed would show that the temperatures with the baffle in use are approximately the same at the ends as at the centre while those without show a marked coolness of the ends compared with the centre.

An alternative use for the "Saxonfone" when an unusual number of casualties requiring resuscitation is brought to a unit is to place the apparatus at right angles to its normal axis so directing the hot air under two resuscitation beds.

To conserve the heat the top of the petrol tins should be lagged with a sheet of asbestos



(or alternatively a kettle of water can be brought to the boil for 'tea, etc.) and the funnels lagged also.

Only one blanket should be placed under the patient to avoid insulation from the heat.

Using the "Saxonfone" in the alternative method greatly reduces the risk of fire as the source of heat is always in view and can easily be watched.

Requirements.—2 Petrol Tins (4 galls.) ; 1 Soldering Outfit.

Method of Construction.—(a) Cut away the perforated top of the petrol tin, which is then inverted ; (b) two air inlets are then cut at the bottom of the tin—dimensions : 6 inches by 6 inches ; (c) two hot air vents are cut in the centre of the tin $\frac{1}{2}$ inch from top—dimension : $2\frac{1}{2}$ inches ; (d) two sides of the second tin are used for the construction of the funnels. Dimensions of these are 1 foot by 5 inches, tapering to $2\frac{1}{2}$ inches. The two funnels are then soldered into the $2\frac{1}{2}$ -inch vent holes at an angle of 45° .

ENDOTRACHEAL ANÆSTHESIA : IMPROVED MODEL OF AIR-ETHER BOTTLE.

BY CAPTAIN A. H. SALEH,
Royal Army Medical Corps.

THE improvised air-ether bottle described in "War Surgery," edited by Hamilton Bailey, for use with an endotracheal tube, consists of a tin with two half-inch punctures in the lid—one connected to the endotracheal tube, the other acting as an air inlet. This arrangement has the following drawbacks : (1) The rebreathed air contains a large percentage of CO_2 and water vapour ; (2) the depth of anæsthesia is difficult to control.

To obviate (1), a simple valve was incorporated so that the expired air did not return to the apparatus.

As regards (2), namely the difficulty in maintaining deep anæsthesia, a glass tube was incorporated in the air inlet so that the air could be made just to skim the surface of the ether or bubble through it.

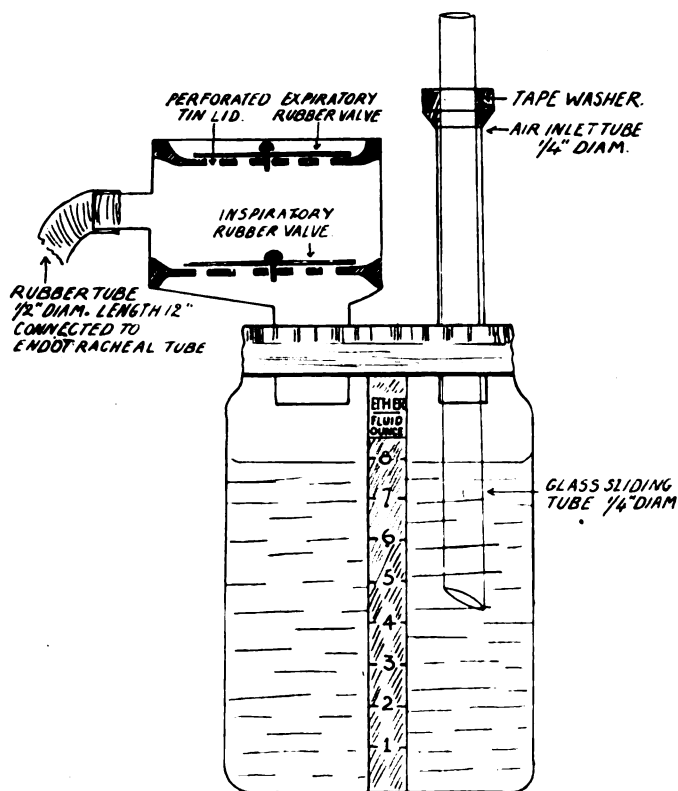
The modified apparatus can be described as follows :—

Components.—(1) One 1-lb. jam jar with a screw cap ; (2) one small round tin $2\frac{1}{2}$ inches in diameter and $1\frac{1}{2}$ inches deep (the one used contained originally formalin tablets) used as a valve.

The Tin.—A number of holes was made into the lid and base of the tin and covered by a small disc of thin sheet rubber, of the type used for respirator valves, and fixed on with a small nut and bolt (see diagram).

A piece of tin made in the shape of a shallow funnel was fixed to the base of the tin. The narrow part of the funnel was passed through the lid of the jar and soldered in place (see diagram).

The Air Inlet.—This consists of a $\frac{1}{2}$ -inch tube of tin pushed through the lid and soldered



Improved model: Air-ether bottle. Drawn to scale.

in place (see diagram). A glass tube $\frac{1}{4}$ inch in diameter fits inside the air inlet tube and is made to slide up and down through a washer constructed of tape.

Use of the Apparatus.—The patient is "induced" in the usual way and an endotracheal tube is passed. The ether bottle with the glass tube pushed right down is then connected to the endotracheal tube.

Once the operation is started the concentration of the ether can be decreased by raising the glass tube so that the indrawn air can be made just to skim the surface of the ether.

Should it be necessary at any moment to administer chloroform or ethyl chloride in order to deepen the anaesthesia the lid of the valve is removed, an open swab placed on the tin and the appropriate anaesthetic dropped on. It has been found, however, that this is very rarely resorted to. Administration of the anaesthetic can be discontinued at any moment

by removing the lid of the tin in which case the valve will cease to function and the patient will breathe air only.

I have used this bottle for the last six months in minor and major surgery and found it to be extremely efficient in that : (1) it is cheap and easy to make ; (2) it uses ether and air only ; (3) it uses less ether in an average case than the Boyle's machine ; (4) it is ideal for long operations—as it rarely requires more than the minimum of adjustment ; (5) it has no fancy and complicated gadgets.

"GUNNER PARKER."

By "R. A. M."

GUNNER PARKER is just an ordinary soldier—if there be really such a person in the British Army—and might have served his time and done his duty unknown save to few had he not had, on or about August, 1942, a sufficiently bad attack of "diarrhoea" to keep him in bed in a Camp Reception Station somewhere in the north of Scotland for a week. However, in spite of the fact that his pain was severe and his diarrhoea of considerable and urgent frequency, apart altogether from the fact that he himself was not a little perturbed to note that there was bleeding therewith ; in spite of all this, he recovered and no more was said—or, mark you, done—about it. And thereby hangs this tale—and its moral.

A certain Regiment, R.A., was at Practice Camp in Wales in August, 1943, putting on the finishing touches prior to taking part in a not unimportant "exercise" designed to produce just that last fineness of polish which would take them and their shells through the Hun like a, well, flash of lightning.

During this period the regiment's own medical officer departed on a "spot of leaf," and that was a Good Thing—believe us, we say this without any bitterness for it is ours to learn—and teach—from the deeds, and no less the misdeeds, of others if and when we can. That being so, the immediate medical care of the regiment devolved on the medical officer at the camp's Reception Station. Now he took a poor view of the business, and that not just because his morning sick parades were larger than heretofore—and than he had expected—but (let us give him all credit) principally because a high proportion of those seeking his aid complained of, and indubitably had, "diarrhoea." Having rapidly established that fact he went that essential step further and said to himself those vital words—"What?" and "Why?" Once he appealed to their curiosity in the right way it didn't take the not-too-far-distant pathologists long to provide the answer to the first fraction of his "satiableness of curiosity"; "*= B. sonne.*" And this very rapidly brought on the scene that other ally, not only of the pathologist and the M.O. (G.D.) but also of the C.O., a hygienist, so that, together, they let in the light of day on the whole story which, condensed, runs as follows.

The regiment moved into Practice Camp on July 14 and all went well till the 20th. Indeed, so far as the outside world knew, nothing happened till August 3, when certain samples were sent to the pathologist, with the result recorded above. But, apparently, no serious view was taken of events till August 10, when they came to the notice of "higher authority." On August 13 the "outbreak" was stopped. But during that preceding three and a half weeks there had been (as nearly as could be ascertained) two hundred and ninety-two—yes, 292—cases of "diarrhoea" and or "enteritis."

The water supply to the camp is satisfactory and, actually, is under routine frequent bacteriological control.

Rations are drawn to individual cookhouses from a central camp ration store which, from a hygiene point of view, is particularly well run.

The layout and management of the camp, including its Institute and, in particular of the conservancy arrangements is also satisfactory, and there has been no fly nuisance.

The site is isolated and without appreciable outside "amenities."

There are six cookhouses ; one each for officers, serjeants and the permanent staff and three for the visiting regiment ; all tolerably well run as these things go.

There were no cases of dysentery—let us be plain about it now—amongst the officers or the camp permanent staff and but two in the serjeants' mess. Though this last-named forms part of the camp permanent establishment, visiting units use it and draft extra " help " into its cookhouse.

Well—the whole business now looks clear and straightforward. Eight of the regiment's cooks gave a history of recent attacks of " diarrhoea " : one in February, one in May, one in June and the remainder during the present outbreak. *B. sonne* was isolated from the stools of only two men ; of these, one employed in the serjeants' mess and one in a battery cookhouse, the latter only at a second examination and from a man who had previously denied suffering but on continued questioning after the positive bacteriological finding admitted to a vague looseness of the bowels about the end of July.

Now if you look at that carefully—and are critically minded, which fortunately our hygiene man was (and all hygiene men should be)—the real solution seems still to be sought. It's true that we've got enough to go on but have we got everything ? We've still, you will guess, got Gunner Parker ! Where does he come in ? He didn't come into this investigation because he had gone to hospital—yes, with " diarrhoea,"—the day before it was carried out.

But Gunner Parker's history runs as follows :—

About August, 1942, when in the north of Scotland and in another unit he had " diarrhoea " as already related.

In December, 1942, he joined this regiment.

By February, 1943, he had found his vocation as " orderly " to the serjeants' quarters wherein he prepared and served to them their occasional tea, bread and butter, etc. At this time there was a short run of diarrhoea cases in the regiment, some eighty in all and mostly in the serjeants' mess ; but this does not appear to have been considered to merit either remark or investigation at the time.

On July 17, 1943, Parker was " attached " to the cookhouse staff of one of the batteries of the regiment and there employed, in the main, on cutting and buttering bread. It is further recorded that in more than probability his services in this humble but useful capacity of a butterer of bread were employed in the other cookhouses of his unit for the batteries of the regiment worked well and happily together. But it is equally certain that he did not assist in the cookhouse of the permanent staff at the Practice Camp, relations being somewhat strained.

On August 12, 1943, he was sent to hospital with his second attack of " diarrhoea," having had none since twelve months previously, and *B. sonne* was isolated from his stools.

And the net result—?

Two hundred and ninety odd cases of " diarrhoea " in less than a month in one regiment, predominantly in one battery thereof : eighty odd positive cases of *B. sonne* infection bacteriologically identified, at least. The regiment held off its " exercise "—think of a unit like that going out under active service conditions mixed intimately with large numbers of other troops.

Well—the answer is in the Regulations for the Medical Services of the Army, isn't it ? " Duties of officers in medical charge of effective troops "—paragraph 185, amended 1939 and read in conjunction with A.C.I. 1727 of 1941—there, and in the decision that acute and painful diarrhoea with blood in the stools is not just a " chill on the liver " ; indeed, that any acute diarrhoea in more than very simple numbers not only merits but must have our careful attention—a missed case may very seriously interfere with the operation of armies.

Major J. G. Hailwood and Lieutenant B. Maddison, R.A.M.C., did all the work which brought these facts to light ; Dr. R. M. Fry of the E.P.H. Laboratory Service, and his staff, dealt with the literal flood of " specimens " examined. A detailed scientific account of this outbreak is expected to be published later.

Travel.

HOW WE SHOT THE ELEPHANT.

BY MAJOR T. A. COCKBURN,
Royal Army Medical Corps.

THE two days previously had been spent looking for elephant but had been fruitless. Elephant tracks by the score had been found—round holes about 1 foot 2 inches to 2 feet in diameter and often 2 feet deep but, incredible as it may sound, the hunters failed to follow them up. Indeed, the Africans here know very little about hunting or tracking, being entirely farmers and, in the end, we did our own hunting and used the natives to guide us home.

We were told that there were 200 elephants within 10 miles radius, and indeed there must have been about that number, but they seemed as elusive as fairies. The bush is fairly open, like an English park land, with grass about six inches long except in the dried up swamps where it is at times about four feet. For about thirty yards along each side of the river, however, it is very dense and the only way through is by following the narrow paths crushed out by the elephants.

The elephants come to the villages about four miles from the river every evening and stay there until dawn, trampling on the crops and yams. The people here are very much under-nourished and work very hard in the fields and it is with no little bitterness that they watch a herd of twenty elephants solemnly destroying the work of weeks.

Then, as the sun rises, the beasts return to the river and have a meal off the dense vegetation on the banks, snapping off the trees and eating the leaves. In the heat of the day it is bathing time and all take their turn in the river via some small gully or by sliding vertically down the 20 foot banks.

This river bush is dangerous for it is impossible to hurry through it, while an elephant just ploughs straight through. On one occasion, we were foolishly all proceeding by separate paths, hoping that a herd on the other bank would cross to our side, when a hippo snorted nearby. Thinking it was a crocodile and that we were caught we all fled for the open. And of course every one mistook the snort of the others for that of the beasts and we came face to face with rifle barrels on triggers. There might easily have been a serious accident.

By the time we had recovered from our fright and had ourselves stiff and having seen no elephant we gave the matter up for our more serious business, deciding that morning to look for a place to show that birds form a reservoir for yellow fever. An elephantive turned up, all dressed up with bow and arrow, and he came to his farm and drive the elephants. We had never been in this manner before, for "one mile," he walked from the river to ten miles and anyway we were growing

looked at the bottles for mosquitoes and 303's for the fa- ants had gone and we finally traced them to the T- s, should we go in after them or wait until they r- ndered, an elephant trumpeted not more than immediately replaced a half-hearted feeling and there were about twelve beasts in the water with an them at right angles to the normal position, acting ed unbelievably huge while at the other extreme

It seemed unbelievable that our rifles could touch the giants so a medium sized bull with fair tusks was chosen. We had been given a lot of advice from the civilian M.O. and from the local D.C. as to the target areas, so one of us, Staff Serjeant Lovegrove, chose to fire at the area between the eye and the ear while Staff Serjeant Griffiths and I aimed at the point of the ear, hoping to hit the heart.

We were in full view of the herd but they took not the slightest notice. So, with ten rounds each in the magazine, fire was opened simultaneously and, at the first shot, the elephant rolled over, obviously badly hurt. Altogether eleven shots were put in at this stage, seven by myself and two each by the Staff Serjeants.

The big four-tusked bull trumpeted and the rest squealed. All turned and fled up the opposite bank and within a minute or so all was quiet here. But, about 300 yards to our left, there was pandemonium for the herd we had been following became panic stricken and trumpeted and crashed into the river, crossing it and streaming up a narrow ravine on the other side. They were four abreast, for all the world like the Southend Road on a fine Sunday evening in peacetime. There must have been thirty to forty of them.

In the meantime, our elephant had rolled into deep water and had regained its feet. This was no mean feat, for later, its liver and lungs were found smashed up while one bullet had gone through its heart. All that was visible was the tip of its trunk pawing pathetically above the water. Slowly and laboriously the beast emerged and then Staff Serjeant Lovegrove gave it the *coup de grâce* with a shot just in front of the ear when it immediately fell over with its feet in the air and disappeared under the water. By this time distance had been closed by wading out to an island, not without some trepidation for crocodiles were very numerous.

And there we sat and nearly wept for, having done what we had scarcely ever expected to do, the only evidence, the only proof we could have to convince the folks at home that we had indeed shot an elephant lay not forty yards away in twenty feet of fast flowing water.

After some futile discussion, a boy was sent back to the camp for help and breakfast and we sat down to wait. Half an hour passed when a casual glance down river spotted something floating about 200 yards away. Was it a crocodile or a hippo or was it—yes it was—our ELEPHANT. Its belly had blown up and made it waterborne and now it was gaily proceeding downstream while we had been thinking it under our noses.

Our kits were hastily put in a pile and a chase downstream commenced in which our bare chests and backs were badly scratched by the bushes on the river bank. Finally the beast was grounded midstream, stern uppermost.

Two Africans soon turned up, forerunners of the entire population of the sixteen villages in that part, and they stated definitely that the crocodiles in that part did not bite. So they and myself swam out to the elephant while the Staff Serjeants kept their rifles handy in case some crocodile might not know the local "non-biting" custom. As I swam out a sunken log scratched my belly and I died a dozen deaths before I realized it was not a crocodile. One's abdomen feels so vulnerable and unprotected under water while swimming.

Some pushing and shoving shifted it off the mud bank and soon, with fresh arrivals assisting, the beast was pulled to the water's edge, in five feet of water. The Africans were to put all the meat in a pile and divide equally but soon it became a "free for all." One, in his haste to secure a testicle, dug his knife into the belly, thereby letting the gas out with a "whoof." The elephant promptly sank. At that moment the carpenter and I were hacking vainly to get out a tusk and, when the head sank six inches under water, it is a gross understatement to say we were not pleased. Some one did steal a testicle and had to swim a long way under water to shake off his pursuers for these glandular organs have a great reputation as givers of strength.

Cutting out the tusks was very difficult and took six hours for the head kept slipping under water and the axe just bounced off the inches thick bone.

Carving the elephant went on apace. The skin was astonishingly thin after the stories

one had been told and so far from stopping a .303 bullet, one shot not only punctured it but passed through the liver, heart, and smashed a rib on the other side.

The Africans were preparing to eat everything—skin, intestines, muscle, trunk and especially the feet. However our steward boys put in some good work and collared three feet, the trunk and some hundredweights of meat.

By evening most of the meat had gone and by morning the bones had been cracked open. The villagers were making sure that nothing was wasted.

Back at the camp a huge fireplace was built with green poles and the meat spread on it. And every day for two weeks a fire was kept going until the flesh resembled charred cinders on the outside.

I had taken the tail but the Paramount Chief claimed it for his staff of office—he didn't get it. Another claimed one of the tusks but was likewise unlucky.

On the way back to Headquarters, the lorry left a strong smell behind to which the piles of elephant meat, two goats dashed by chiefs, two dozen chickens and guinea fowl for the laboratory and a huge eagle with one wing in a splint all contributed.

Back in civilization, the Africans of the party sold ridiculously small pieces of meat for 10s. or £1 each although all kept some to make them strong should they fall ill.

Looking back, that whole day seems like a dream only there is the visible evidence of the tusks and tail to prove that it really happened.

Reviews.

SURGERY OF MODERN WARFARE. (Third Edition). Parts I, II and III. Edited by Hamilton Bailey, F.R.C.S. Edinburgh: E. & S. Livingstone. 1944. Part I, pp. xvi + 151; Part II, pp. 152–328; Part III, pp. 329–506. Price 15s. each part.

The call for a third edition of this work within two years of its first appearance is a tribute to its popularity. The third edition is being issued in six parts, the first three of which now come under review. Despite wartime difficulties, of which the editor-in-chief seems to have had a full share, the volumes are beautifully produced, on good paper and with a wealth of illustrations.

The list of contributors to the new edition has been greatly augmented and actually totals seventy-seven. Newcomers are either recognized authorities on their subject or are represented by those who have had recent practical experience in the field of which they write.

In Part I Professor Fleming gives a useful survey of the bacteriology of wounds.

The chapter on Chemotherapy holds a balanced view of the subject and is up-to-date so far as is possible. Shock and the various practical measures for its treatment take up the rest of this volume. It may be questioned if it is judicious to detail the cisternal injection of potassium phosphate solution as an approved method of treatment in this relationship.

In Part II the subject of Burns is considered in a general chapter. After reading it one may well come out with a somewhat confused idea as to what precisely one ought to do in the treatment of any burn. This is perhaps not surprising if one considers the state of indecision which exists in relation to this subject in what may be termed the composite surgical mind of this country! This section is completed by a valuable contribution from McIndoe on grafting for skin loss.

The chapters on wound excision and wound treatment written respectively by Sampson and Seymour Barling are to be recommended to the attention of every practising surgeon.

A balanced view of the closed plaster treatment is presented with a sympathetic view of the æsthetic side of the problem.

It is noticeable that a chapter on the X-ray treatment of gas gangrene is inserted although the author of it maintains a judicial attitude towards the value of the method.

It is also interesting to see a protagonist of the maggot treatment of wounds given a place. The author of this chapter goes so far as to adumbrate the use of the method in the first-aid treatment of wounds!

The third booklet opens with a series of chapters on wounds of the blood-vessels. All are good but no less than nine authors are responsible for the section so that the picture presented to the uninitiated is a somewhat patchy one. One begins to wonder how much farther this principle of "dispersion" will be pushed in the modern textbook.

The fixation of the limbs is dealt with under chapters devoted to special types of splint commonly employed. In chapter xlv the ambiguous term "extension" is used when traction is in question but perhaps we all sin in this respect. The Thomas' splint gets its proper historical place in the capable hands of McMurray. A reminder of the value of the Jones' abduction frames for some difficult cases is given in the succeeding chapter.

The final section on amputations has a slightly last war atmosphere. Its author is a convinced advocate of end-bearing stumps. He produces considerable evidence in support of his view but does not quote very fairly the contrary conclusions arrived at by the Ministry of Pensions on this point.

In general, the technique of various amputations is fully described though details do not conform to those of surgeons who have had the most experience of this subject.

Altogether the first three volumes of this work promise that the whole will give an up-to-date and authoritative picture of current traumatic surgery.

C. M. P.

SUPPLEMENT TO THE DENTAL TREATMENT OF MAXILLO-FACIAL INJURIES. By W. Kelsey Fry, M.C., M.R.C.S., L.R.C.P., L.D.S. R.C.S.Eng., P. Rae Shepherd, L.D.S. R.C.S.Eng., Alan C. McLeod, D.S.S.Penn., B.Sc.(Dent.)Toronto, L.D.S. R.C.S. Eng., and Gilbert J. Parfitt, M.R.C.S., L.R.C.P., L.D.S. R.C.S.Eng. Oxford: Blackwell Scientific Publications, Ltd. 1943. Pp. ix + 194. Price 21s. net.

I am afraid that some of us, after a cursory glance through this supplement, will be tempted to exclaim "What; surely not another volume on this subject by the same authors, and after a lapse of only fourteen months!"

It must be confessed that these were my feelings.

After careful study of the volume, however, I have been completely converted. The parent book which we considered to be the be all and end all of modern Maxillo-Facial Treatment had, of necessity, to be as concise as possible. Thus, unwillingly, the authors had deprived it of a certain amount of body. This has now been amply supplied by the Supplement. By this it is not intended to imply that the latter is merely an amplification or re-interpretation of the parent volume. A short study will convince the reader to the contrary. Before passing to the most popular sections of the book (the treatment of actual cases), the reader would be well advised to study carefully those on Radiology, Pathology and Surgery.

Apart from the excellent illustrations, the authors have stressed several points of paramount importance, i.e. the necessity for approximation and immobility of fragments and efficient drainage in infected cases; also the importance of retaining islands of bone in comminuted fractures.

Regarding immobility, the bad old theory that a little movement stimulated the production of callus, and which covered a multitude of ill-fitting appliances, should now, once and for all, be eliminated.

The bulk of the book is concerned chiefly with description and treatment of actual cases illustrated by excellent photographs and radiographs. These cases, forty or so in number, are chosen with great discrimination and appear to cover every known variety and complication of jaw injury.

After careful study of them, even those of us who have never operated on a case should not fail to grasp the main principles of treatment and thus avoid putting ourselves into the unenviable position of the dental surgeon whose case is quoted on page 334.

The outspoken comments of the authors on mistakes made during treatments are highly

instructive and it should be a comfort to all of us to know that even the experts have still something to learn on this all important subject.

The authors have now developed a treatment technique which is practically the last word. They have been most candid regarding their own errors and generous to those of others. In view of these excellent traits, it would appear to have been unnecessary to resort to rather sweeping statements regarding a tried and successful method of treatment: last sentence of third paragraph, page 341, last paragraph page 368, third last paragraph page 449.

This Supplement and its inter-dependent parent volume are 100 per cent educational value to the Dental profession and will undoubtedly find their way to a high niche amongst our professional textbooks.

J. W.

R.A.M.C. By Anthony Cotterell. London: Messrs. Hutchinson & Co. 1943. Pp. 116. Price 6s.

In little more than 100 pages Major Cotterell gives a comprehensive account of the activities of the R.A.M.C. The greater part of this book is devoted to an account of the treatment, evacuation and subsequent rehabilitation of the sick and wounded under conditions of active service but the preventive work of the Corps is not neglected. Tribute is paid to the way in which the Army Medical Services have adapted themselves to the complicated and highly mobile warfare of the present time and have, under the most trying conditions, brought the highest medical skill to within very close range of a rapidly changing front. The good work of the regimental stretcher bearers and transport drivers receives due recognition. An excellent descriptive background is provided by the experiences of soldiers injured in battle and of R.A.M.C. officers in action in various theatres of war. The book is illustrated by a set of admirable and well-chosen photographs.

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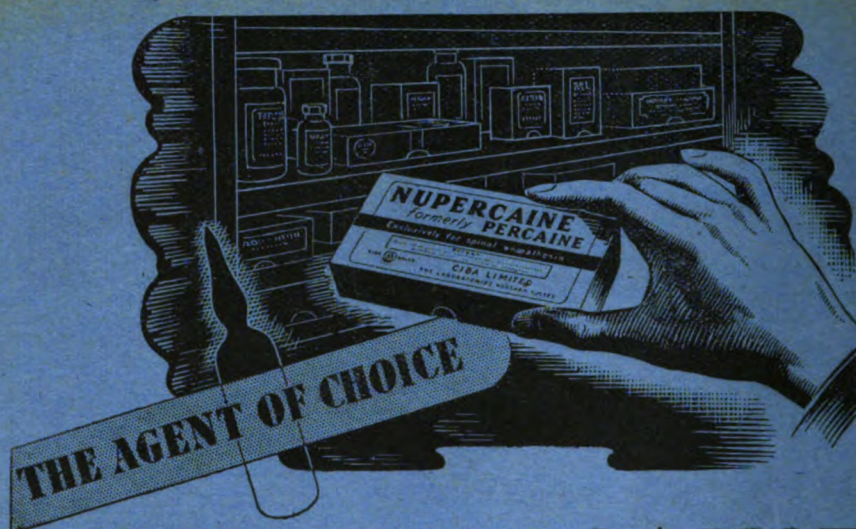
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MONTHLY

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Journal of the Royal Army Medical Corps.

Original Communications.

THE MEDICAL ASPECTS OF THE OCCUPATION OF CAPTURED ENEMY TOWNS AND PORTS.

BY COLONEL W. L. SPENCER-COX, M.C.

(Continued from p. 104.)

VI.—THE HYGIENE ASPECT.

A.—*The Hygiene Reconnaissance.*

As soon as possible a fairly detailed idea of the public services of the town is ascertained by contacting the local M.O.H. and, if possible, his Water and Sanitary engineers. The difficult problem arising from their having fled, as has been the case in several towns, is patent.

(i) *Water*.—Usually this is damaged and only a moderate quantity is available and in some towns none at all. Broadly speaking, all waters need to be chlorinated without necessarily giving any free chlorine in the town. Other details are necessary such as the number and capacity of reservoirs, rate of flow, bacteriological reports, etc.

(ii) *Drainage*.—This is usually damaged with subsequent fouling. Details are required about disposal, pumping and flushing devices.

(iii) *Street Cleaning*.—Initially this is at a standstill and large piles of rubbish abound. This has to be rectified at once and if necessary the whole system reorganized to include the worst areas. New labour with supervision must be found and a reorganized clearance to the tip instituted. In nearly all cases town cleansing vehicles have been removed and the only alternative is horse-drawn carts. Disposal is usually by dumping with no effort at control. If it is anticipated that the town will be used for a long period this will have to be supervised by Army Field Hygiene personnel.

(iv) *Infectious Diseases*.—Incidence of infectious diseases especially plague, cholera, malaria and its control, typhoid and dysentery with special reference to epidemics.

(v) *Prostitutes and V.D.*—Strangely enough prostitutes always seem to be the last to leave and are nearly always operative on occupation. Their control is difficult, especially in friendly countries. A quick survey is necessary and the planning of P.A. Centres.

(vi) *Medical Services*.—Normally these have been completely disorganized and a provisional scheme must be introduced. Doctors have to be called back from the country by all

means possible and essential medical services re-started. The whole is complicated by the almost inevitable lack of water and electricity.

(vii) *Latrines and Facilities.*—On the Docks the most satisfactory type is the hang-over latrine with direct dropping into the sea.

(viii) *Rebilleting Schemes and Shelters.*—The shelter problem is often very acute owing to the large proportion of houses made uninhabitable. What schools and barracks, etc., there are left after military needs have been met can be used for rebilleting. A rebilleting committee should be set up immediately to reconnoitre available space, to re-allot such space and to persuade as many people to leave the shelters as will. The committee should consist of five members, the Mayor, the M.O.H. and three others detailed to reconnoitre available accommodation.

(ix) *Cafes and Shops.*—Subsequently various cafes, barbers' shops and restaurants are inspected and hygiene rules are given for compliance. Lemonade, beer and ice factories should be seen and instructions given.

B.—*Hygiene Work to be put in hand.*

(i) *Water.*—The ideal spot for the chlorination in bulk of the town supply is at some central reservoir which is the meeting point of all waters consumed in the town. If this is so matters are easy but, often, there are two or three different sources which are perhaps under different companies all of which must be treated. Again there may be no reservoirs and some suitable place has to be chosen which will give a sufficiently long contact time.

All types of reservoirs have been met with, some very good and others dirty, but seldom is there any chlorinating apparatus available. The standard one used by the Army so far has been simple, 44 gallon drum, improvised drip chlorinator, with a float feed. All the information that is necessary is the rate of flow usually given in litres per second. Initially the whole scheme is operated by Fd. Hyg. personnel but it is handed over to A.M.G.O.T. for continuation with special instructions as to its operation.

(ii) *Street Cleaning.*—Once an idea of the extent of litter is obtained it is necessary to group or dilute the labour available. Additional labour is the Mayor's responsibility and their payment. There must be no doubt about this as it leads to endless confusion and irritating delays. The Mayor can make application to A.M.G.O.T. for help in payment. Again it has often been necessary to put Army Fd. Hyg. personnel in charge and it is a whole-time job for a corporal who is an expert to supervise the average Italian.

(iii) *The Medical Services.*—These are always at a standstill and remain so till the doctors return from their "hide-outs." Until they come back the barest essentials are put into operation. The easiest way to get doctors to return is to put a proclamation up through A.M.G.O.T. and it passes from mouth to mouth in a very short time. It has been found that, with encouragement and practical help, the civilian medical services come to life remarkably quickly and satisfactorily.

(iv) *Petrol Ships.*—Pioneer Companies employed on unloading petrol ships are supervised so as to prevent undue hardship. This is an unpleasant task and, in the case of the old almost useless "flimsy" petrol containers, somewhat hazardous. Petrol fumes are so strong in these cases as to prevent more than twenty minutes' work in a hold before collapse.

(v) *Cafes, Barbers' Shops, Etc.*—A S/Sjt. and Cpl. of the Fd. Hyg. Sect. are employed on inspecting all bars, barbers' shops, etc. If these are obviously unsatisfactory they are placed out of bounds by the C.M.P. Rules for compliance are distributed and premises are inspected periodically. If the standard is still poor they are placed out of bounds.

(vi) *Prostitutes.*—The running of controlled brothels is a myth and unpractical. Until the Armistice with Italy was signed all prostitutes were put into protective custody and were consequently harmless. Now that Italy is a friendly country this has had to be revised and brothels are only put out of bounds; a difficult, hazardous and unsatisfactory measure.

Stricter observation of the prostitutes is therefore necessary and a tightening of civilian control.

P.A. Centres adequately sign-posted are opened at the earliest possible moment.

VII.—SUBSEQUENT ACTION.

A.—*Medical Arrangements.*

The normal medical lay-out has already been described and it now remains to put it into action. In large areas Medical Administrative Instructions were issued ; in smaller ones the detail was given in Area Orders. In either case the same general principles were maintained.

(i) *Reception.*—Sick and casualties will either be local or from forward areas.

Local casualties pass through the Central M.I. Room or Unit R.A.P.s to the receiving Fd. Amb. while those from forward areas go direct to the Fd. Amb. The Fd. Amb. acts as a general filter through which all cases pass and are then redistributed as follows : Surgical—to the C.C.S. open at the time ; Medical—to the second C.C.S. (without F.S.U.) or to the Fd. Amb.

Minor Sick, Throats and V.D. to the Fd. Amb.

This plan was employed in all the battles in the desert and worked very smoothly.

(ii) *Detail.*—The duties of the various units ; the method of drawing rations and medical stores ; the situation of blanket and stretcher dumps ; the returns and records required ; means of intercommunication.

It must be stressed here that signal communications are absolutely essential and yet painfully inadequate. D.R.s are at a premium and the telephone is utterly unreliable.

Wireless was used to a great extent in the desert but the link to Army was often very poor. At times messages and returns have had to be sent by 3-ton lorry. A lot remains to be done for Medical Signals and this is a point which must be constantly borne in mind, particularly when dealing with the difficult problems of Air and H/Ship Evacuation.

(iii) *Prisoners of War and Civilian Sick and Wounded.*—The most explicit instructions must be issued regarding disposal and treatment of P.W. and civilian sick and wounded which, in some places, assumed such proportions as almost to paralyse the legitimate work of Medical Units.

(a) *Prisoners of War.*—Almost invariably there will be either an existing Enemy Military Medical Unit or Enemy Medical Staff though the amount of work which can be done is extremely variable. Normally, however, such an establishment can deal with all sick and lightly wounded while the graver cases must be admitted to British units until more permanent measures can be arranged.

(b) *Civilians.*—In the same way it is seldom that there is not either a civilian hospital or dispensary remaining, to which civilian sick must be directed. As pointed out later, the responsibility for these will ultimately devolve upon the A.M.G.O.T.

(iv) *Means of Evacuation.*—These may be as follows : (a) Air, (b) Road, (c) Ship, (d) Train, and are here considered at some length.

(a) *Air.*—It is the responsibility of the unit having URGENT cases for Air Evacuation to notify the Air Evacuation Section and of the Air Evacuation Section to notify Medical Units of the availability of planes.

In practice a load of twenty to thirty cases are called forward to the L.G. and the Air Evacuation Officer gets them off on returning planes. He will have a rough idea each day of how many planes are expected and, directly the number of patients at his section are nearly all evacuated, he sends word to the Medical Units for more.

Cases which fail to be evacuated by nightfall are kept in the Section penthouse.

More serious cases are only sent to the L.G. for a guaranteed plane.

(b) *Road.*—Road is the second most important form of evacuation and, in the desert, the most prodigious distances were covered by the M.A.C.s. Normally there will be one M.A.C. under command of each Corps and one or more under Army. Corps will evacuate to the

Medical Areas (referred to here) and the A.D.M.S. Area is responsible for their onward routing to Base units by the Army M.A.C.s.

Various methods are employed, the principal being "CONVOYS" and "TRICKLE."

"CONVOYS."—O.C., M.A.C., was informed by units how many cars were required for the morning evacuation and these were sent, loaded, and moved off in Convoy.

By the "TRICKLE" method, so many cars were stationed at the evacuating Medical Units; these were loaded and sent off by the O.C.; as the first car passed the M.A.C. check post a note was handed in saying how many more cars were required. When these latter had left the O.C., M.A.C., replaced them by a further number.

Both methods had their advantages and disadvantages but, in either case, if the run is a long one, a "Coffee Stall" formed by a detachment of some unit on the L. of C. is required at a convenient place on the route to provide tea, etc., and a rest for the patients on their way through.

(c) *Ship*.—The most complicated operation of all and a complete lecture could be given on this subject alone.

The points in brief are these :—

(i) If the ship can come alongside, the operation is simple and requires nothing more than careful organization and timing.

(ii) If the ship lies out in the harbour, "Craft" have to be used and these may be : "Z" Craft—far and away the best; L.C.T.s, L.C.M.s, L.C.I.s; local tugs, launches and even dumb lighters; motor launches (carried by hospital carriers and extremely useful); the ships lifeboats—the worst of all.

All the craft, with the exception of the last two, are obtained by arrangement with A.Q.M.G., Mov. and Tn, and the Sea Transport Officer. Regarding craft generally, the value of the motor launches mentioned above cannot be over-stressed; they are handy little craft, carry racks for seven stretchers, and at times have proved themselves quite invaluable—cannot these be provided for Hospital Ships as well?

(iii) There must be an efficient stretcher party, at least 1 Officer and 30 O.R.s, to handle the stretchers and brew up tea and comforts on the dock side.

(iv) There must be constant contact between the E.M.O., the O.C. Ship and the Master. The latter will always be in a hurry to get away at the earliest moment. The former should be provided with a small launch or, better still, a "Duck" for this purpose.

(v) The E.M.O. must ensure the return of all stretchers, blankets and pyjamas going on board with the patients and will also ask O.C. Ship to give him as many extra as he can spare *plus* any Medical Comforts that the Area may be short of.

I have purposely omitted the methods of calling up ships, as these are complicated to a degree and cause the greatest number of "Rockets!" to the largest number of people in the smallest possible time!

(d) *Train*.—Except in the early days of the Battle of Alamein, and in the Base Areas which are not under discussion here, there were no trains.

This means of evacuation is, however, a relatively simple one provided that there is a good M.A.C., a trained loading party and a good O.C. train.

The main advantage is that a train arrives (more or less) at a fixed time, which none of the other means of evacuation do, and it is possible therefore to plan backwards at what time the relative moves will take place. The details of train loading are generally known and will not further be discussed.

B.—Liaison with Army, Corps and Divisions.

It can be said with some truth that, in the desert, EIGHTH ARMY hardly wrote any paper at all. People got together in many odd places, discussed arrangements, marked maps and returned to put their orders in force.

It is also a golden rule NEVER to pass the H.Q. of any formation without dropping in and

contacting your opposite number—ten to one he has been praying that he might get in touch with you somehow.

It is an accepted axiom that "time spent in reconnaissance is seldom wasted" and it is equally true that five minutes spent at another H.Q. is NEVER wasted.

It has been stated earlier that D.D.M.S., ARMY, will always call a Conference at critical times—but A.D.M.S., Mobile Area, must constantly contact HIM, D.D.M.S., CORPS, and when possible, A.D.S.M.S., DIVISIONS. It is by this means alone that he can keep in the picture regarding expected number of casualties, the means of evacuating them and the moves of Medical Units.

The telephone is more generally a curse than a blessing and the A.D.M.S. who is content to sit in the office and attempt to communicate by telephone, wireless or signal, will fail.

In Libya and Tunisia, hundreds of miles of frightful roads were covered, often merely to contact one Officer, but that time was seldom wasted.

C.—O.E.T.A. and A.M.G.O.T.

In Libya we had O.E.T.A. (Occupied Enemy Territory Administration) and in Sicily and Italy, A.M.G.O.T. (Allied Military Government of Occupied Territories).

These organizations are virtually the same and constitute the Military Government of the Area when handed over to them by the actual occupying troops.

Representatives arrive in the early stages but the Principal Officer does not take over control until actual operations have terminated.

They are responsible for the control of all the Civil Affairs of the town and, therefore, from the medical point of view, a close liaison must be maintained. As an example, the D.A.D.H. commences to put the hygiene of the town on a sound basis for the protection of the health of the troops but, as soon as A.M.G.O.T. is established, he can hand over a great deal of the work to them.

In the same way, purely CIVIL hospitals, working for the civilians and not taken over by Military, and the important question of FEEDING the civil population, are the responsibility of A.M.G.O.T.

VIII.—THE HAND-OVER.

The Mobile Area seldom stays long in any Port. Directly the required number of convoys have been dealt with, or the Port is considered to be in smooth working order, it will go forward ready to open up the next.

In its place, a Sub-Area Commander, Base and L. of C. Sub-Area Commander, or even a Town Major, will take over. In my experience such relieving units have invariably been either fresh from home, under establishment, lost on the road or with no knowledge of their job. In any case it must be appreciated that their task is a difficult one and all possible assistance must be given. The more important points are these :—

(i) *Local Files.*—All files, whether Medical Arrangements—Hygiene—Supplies—Malaria, or other, dealing with the purely *local* aspect are put in separate covers and marked accordingly : "CATANIA"—Malaria. "TRIPOLI"—Medical Locations, etc.

If any of the matter is of importance or required later for the Quarterly Report, etc., copies are taken and kept ; otherwise the files are handed over in bulk to the newcomers.

(ii) *Maps and Plans.*—The number of maps, town plans and diagrams which pass through the hands of a Mobile Area is quite prodigious. It is all the more necessary, therefore, to dump or return to Map Depot all that are not required for the next move.

Town Plans and Maps of the immediate Area marked with Medical and Administrative Locations are of the utmost value to the incoming staff and are handed over.

(iii) *The Actual Hand-over.*—Provided the new H.Q. arrives complete, this is easy ; each officer briefs his opposite number and it can readily be done in one day.

The two A.D.S.M.S. examine the maps, discuss the Medical lay-out, visit the more important units and note future developments.

The D.A.D.s of Hygiene drive round the Area and make sure that the O.s C. Fd. Hygiene Sections are working to their programme.

The E.M.O.s together visit the docks, contact N.O.I.C., S.S.T.O. and A.Q.M.G. Movements, examine the berths and discuss the merits of available Craft in that particular Port.

The Pool Medical Officers hand over their M.I. Rooms.

Unfortunately this ideal situation seldom occurs. More generally the hand-over is confined to such officers of the relieving Medical Staff as may have arrived. These will generally be the A.D.M.S. and one of his Staff.

In these circumstances, only a partial hand-over can be arranged and it will be necessary temporarily to leave behind some of the Area Staff; a particularly unsatisfactory arrangement.

The Area A.D.M.S. and the D.A.D.H. will always have to leave and go ahead with the rest of the H.Q. while the E.M.O. who, as explained above, fulfils the duty of D.A.D.M.S. will remain for a few days "holding the hand" of the new H.Q.

It seems unfortunate that while other members of a relieving staff arrive on time the Medical Branch seldom does.

IX.—ACKNOWLEDGMENT.

My acknowledgments and grateful thanks are due to Brigadier E. Phillips, *C.B.E.*, *D.S.O.*, *M.C.*, *D.D.M.S.*, Eighth Army, not only for his constructive criticism of this article and his permission to submit it for publication but also for his wise counsel and unfailing support during the long and dusty journey from Alamein to Bari.

CAMP-SITING IN MALARIOUS DISTRICTS OF WEST AFRICA.

BY MAJOR C. R. RIBBANDS,

Royal Army Medical Corps.

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 - (1) Malaria prevention by segregation of white troops.
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I.—INTRODUCTION.

THE importance of the proper siting of military camps in malarious districts has been long recognized and, in some parts of the world, camp-siting has been a major factor in military anti-malaria work. This is true of parts of the Middle East, where anopheline breeding places may be few and far apart, and it has often been easy to pitch major camps in dry country outside the normal flight range of anophelines from these breeding places.

In West Africa very few districts are completely free from malaria risk and the consequences of correct camp-siting are therefore less spectacular. In areas where there are no anopheline-free districts camp-siting is a difficult and complicated matter because, when one is forced to choose between several localities, all containing anophelines, the particular behaviour of these mosquitoes as well as their relative densities determines the relative malaria risk within each area. But the importance of camp-siting is not diminished by its difficulty for there are many localities where malaria risk increases or decreases tenfold within 100 yards.

Many of the conclusions now recorded are based upon experimental work in military areas, details of which cannot yet be published, and while these results apply to West Africa it is likely that many of them will be applicable in some other malarious districts.

II.—COMPOSITION AND DENSITY OF THE MOSQUITO POPULATION.

The composition and quantity of the local mosquito population must be a very important factor in determining the malaria risk in any locality. This factor can only be accurately assessed by a competent entomological survey.

Entomological survey for military purposes is beset with difficulties, the chief one being that the survey must obtain results within a few days or even hours, and the conclusions drawn from these results are only an accurate guide to the malariousness of that locality *at that time*. The size of a mosquito population fluctuates tremendously and the seasonal variation in a population can only be estimated as the result of knowledge of the local climate and the breeding potentialities of similar districts. For this reason, too, entomological survey yields more useful data in the wet season, when mosquitoes are abundant, than in the dry season.

The difficulties attending the interpretation of an entomological survey are no reason for not carrying it out for inferences based upon a few known facts are likely to be of much greater value than inferences made without any facts to support them.

Methods of estimation of the composition and quantity of the local mosquito population are given in Appendices 1 and 2.

III.—RELATION BETWEEN THE HUMAN POPULATION AND THE MALARIA RISK.

The second most important factor in determining the malaria risk in an area is the human population, which is the reservoir of malaria infection, but the action of this factor is complex and its influence is frequently ignored or misunderstood.

(1) *Malaria Prevention by Segregation of White Troops* (fig. 1A).

Since the infected human population is the only source from which mosquitoes can become infected with malaria it is clear that any body of troops can be protected from malaria if they are not already infected (or have been successfully treated after infection) and if the distance between their camp and the nearest infected human population is outside the normal

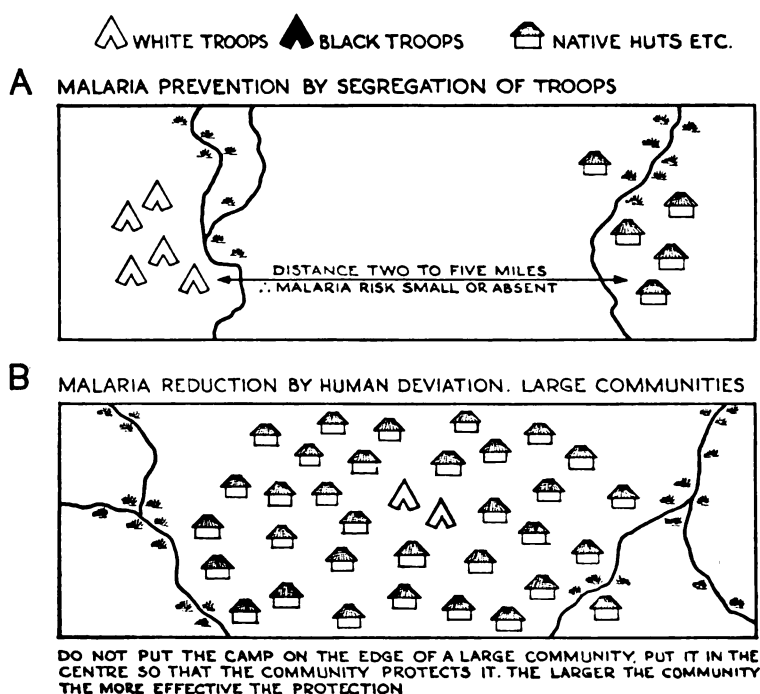


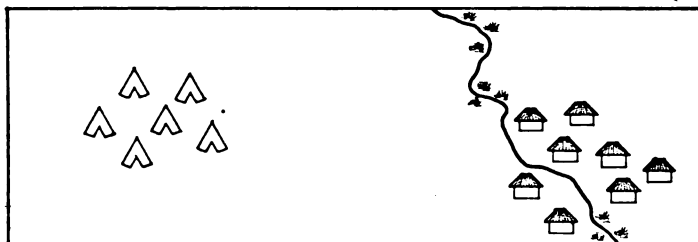
FIG. 1.

flight range of the mosquito. This protection would apply irrespective of the density of potential malaria-carrying anophelines in and around the camp. The maximum recorded flight range of West African anophelines is $4\frac{1}{2}$ miles (De Meillon, 1934 ; Adams, 1940) ; the effective flight range (the distance which they are likely to travel in numbers sufficient to cause an appreciable malaria incidence) is variable but it is usually less than 3 miles. Hence malaria risk could be eliminated on any camp site occupied by uninfected troops and situated 5 miles from the nearest infected humans ; and the risk would be small if the nearest infected humans were 2 miles away, irrespective of the number of anophelines on the site and providing the breeding grounds were not situated between the camp and the village. Where the breeding grounds are between the camp and the source of infection it must be remembered that the flight range of the anopheline will be in both directions from its breeding ground to which it must return at least once between the time of infection and infectivity. These

distances should, in this case, be increased, possibly to as much as 8 miles and 3 miles respectively.

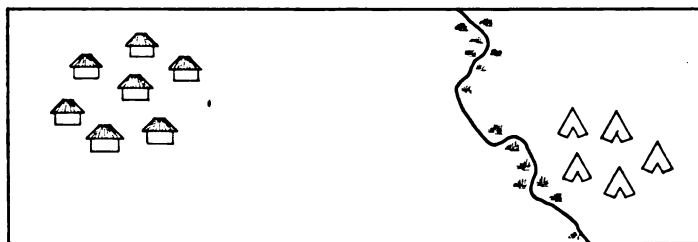
Where this method of malaria prevention is contemplated, and there are native troops, it must be remembered that the native troops are usually already infected and therefore personnel to be protected should be separated after nightfall from native troops and native servants as well as from the local infected population. Elimination of infectiveness by regular administration of plasmoquine provides a possible alternative to this complete segregation (cp. Barber *et al.*, 1932).

C(1) MALARIA REDUCTION BY HUMAN DEVIATION
SMALL COMMUNITIES WHICH CANNOT BE ELIMINATED



WHERE THE NATIVE VILLAGE IS NEARER TO THE BREEDING GROUND, THE LARGER THE VILLAGE BECOMES THE SMALLER WILL BE THE MALARIA RISK

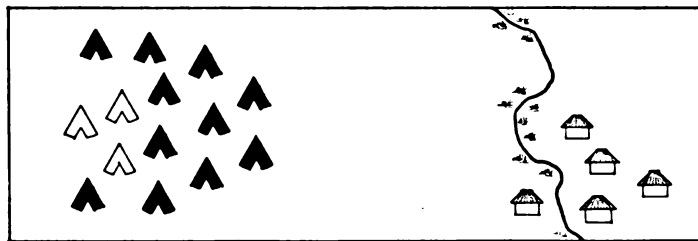
C(2)



WHERE THE CAMP IS NEARER TO THE BREEDING GROUND, THE LARGER THE VILLAGE BECOMES THE GREATER WILL BE THE MALARIA RISK

D

CAMPS CONTAINING BOTH WHITE AND BLACK TROOPS



PLACE THE BLACK TROOPS AS A SCREEN BETWEEN THE WHITE TROOPS AND THE SOURCE OF ANOPHELES

FIG. 1 (continued).

(2) *Malaria Reduction by Human Deviation.*

(a) Where the camp becomes part of an existing community (fig. 1b).

As the size of a human population increases the size of its attendant anopheline population also tends to increase in consequence of both increased local breeding and the attraction of anophelines from greater distances: but the anopheline population is limited by the potentialities of its breeding ground and the increase in it is not so great as the increase in the human population and therefore the number of anophelines *per person* decreases. As the number

of anophelines per person decreases so does the risk of malaria transmission to any susceptible individual, or group of individuals, temporarily part of this population.

The converse also holds true: as the size of the human population decreases the size of the mosquito population also decreases, but less rapidly, and therefore the number of mosquitoes *per person* increases. This principle has been proved experimentally—when 90 per cent of the people were removed from a village in the Gold Coast the mosquito population attracted to that village decreased by 70 per cent but the number of mosquitoes per person was trebled.

This principle, that the number of anophelines *per person* in a community decreases as the size of that community increases, explains why the malaria risk in rural areas is usually much greater than in towns and why the number of anophelines found in isolated houses is usually much greater than the number found in similar houses in villages. (It may be noted, in parenthesis that, in the case of *Aedes ægypti* and other mosquitoes which breed domestically, the converse tends to apply.)

From this principle the deduction may be drawn that, except in the very fortunate instances where malaria prevention by elimination of the infected population is possible, the population in the immediate vicinity of military camps may, as far as malaria considerations are concerned, be disregarded or actively encouraged. In cases where complete removal of such populations is impracticable, partial removal is worse than useless (but a case could be made out, on other grounds, for removal of all children, the richest reservoir of infection, where this is possible but removal of all adults is impracticable.)

(b) Where the camp is separate from the existing community (fig. 1c, 1 and 2).

Normally it is incorrect to consider the camp as part of the local community because it is separated from this community by some distance. In these circumstances the communities must be considered as separate units.

Let us suppose that there is an infected native community situated at N and a military camp at T and that these both attract mosquitoes from a breeding ground at A. Then if the native population at N is increased it will attract to itself a greater proportion of the mosquito population and this will tend to decrease the malaria risk at T. But at the same time the increased population at N will provide more blood feeds and tend to enlarge the mosquito population at A, thereby tending to increase the malaria risk at T. The relative importance of these two opposite effects cannot always be calculated but considerations of the factors involved leads to the formulation of the following tentative working rule: where the infected community is nearer to the breeding place than the susceptible community any increase in the size of the former community will tend to reduce the malaria risk in the latter; but, where the infected community is much further from the breeding place than the susceptible community, any increase in the former will tend to increase the malaria risk in the latter.

(3) *The Relation between White Troops and Black Troops* (fig. 1D).

Although anophelines are able to travel long distances they normally prefer the nearest available blood meal. This is why when, as usually happens, the anopheline breeding places are outside a village, the anopheline infestation of the huts at the edge of that village is much greater than the infestation at its centre. One example of this will suffice: a small village in Sierra Leone, consisting of twenty-four huts, arranged in an irregular row. The centre of the village was 550 yards from the breeding place and the nearest hut was 400 yards from the breeding place; the anopheline population of the nearest hut was ten times as great as that of the huts in the centre of the village.

This example shows how the placing of an alternative source of blood meals between susceptible troops and anopheline breeding places can greatly reduce the malaria risk to the troops. In West Africa this fact has never been appreciated and, in consequence, in camps containing both white and black troops (the former susceptible, the latter infected and relatively immune) the white lines are often placed nearest to the water supply, which is often also the source of anophelines, and the native lines are beyond them—hence the white

troops act as a protective screen for the black troops and the attractiveness of the latter brings mosquitoes through the white lines, an exact reversal of what is desirable.

When white troops and native troops have to be camped together in malarious districts the native lines should be placed, where possible, between the anopheline breeding places and the white lines so that they serve as a very efficient protective screen.

There is a prevalent belief that, as an anti-malaria precaution, white troops must never be quartered in the immediate vicinity of native troops but, in many circumstances, this is incorrect, not merely because an increase in the number of men tends to produce a decrease in the number of anophelines per person but also because native troops provide a more attractive and easier food supply; hence, provided the natives are correctly sited between the whites and the anophelines, the presence of native troops in close proximity to white troops will frequently tend to divert some of the mosquitoes which would otherwise be attracted to these white troops.

IV.—EFFECT OF PREVAILING WIND ON ANOPHELINE BEHAVIOUR.

The maximum recorded flights of *A. gambiae* and *A. funestus* of distances up to $4\frac{1}{2}$ miles were made either down or across wind but the same worker records a flight of $1\frac{1}{2}$ miles made against a 4–7 m.p.h. wind (Adams, 1940). This datum provides evidence that mosquitoes can travel greater distances down wind but can also travel up wind; since anophelines hunt by scent they are likely to be most attracted to humans upwind.

Therefore if there is a strong and persistent prevailing wind (e.g. in some coastal areas) up wind camp sites are better but, when the wind is weak or variable, this advantage disappears and down wind sites may be healthier.

V.—EFFECT OF ALTITUDE ON ANOPHELINE BEHAVIOUR.

Experience in Sierra Leone leads to the conclusion that altitude is a very important factor in reducing anopheline infestation and that where there are two sites equidistant from the same breeding place, but one is a few hundred feet above the other, the higher will be the healthier. Hence camp-sites on hills are more suitable, not merely because they are better drained but also because their altitude deters anophelines. This may be due to the varied wind currents over hilly districts.

VI.—EFFECT OF BUSH ON ANOPHELINE BEHAVIOUR.

A. gambiae and *A. funestus* do not fly very close to the ground and therefore they are not mechanically hindered by dense high bush (De Meillon, 1937). A League of Nations Committee has also held that bush-clearing is not an effective anti-malaria measure (Hackett *et al.*, 1938). Yet in some parts of West Africa extensive bush-clearance near camps has been carried out, ostensibly for this purpose.

Experiments designed to test the effect of bush-clearing, and carried out in the Gold Coast, showed that anopheline penetration was not reduced by the complete elimination of dense bush from an area 300 yards in diameter round a village and confirmed that dense bush does not encourage anopheline infestation. Hence when selecting or preparing a camp-site the presence of bush need only be considered in relation to anti-mosquito and anti-fly measures and not to anti-malaria measures.

VII.—ACKNOWLEDGMENTS.

I am indebted to members of the Staff of the Army School of Hygiene for valuable criticisms of the manuscript and to Private M. W. Smith for the illustrations.

VIII.—SUMMARY.

(1) In West Africa a susceptible population can be kept completely free of malaria, irrespective of the number of potential malaria-carrying anophelines in their locality, if they are kept 5 miles from the nearest infected humans and they can achieve a considerable

degree of protection at a distance of 2 miles. These distances must be increased, possibly to as much as 8 and 3 miles, respectively, where the breeding grounds are between the susceptible and the infected humans.

(2) The number of anophelines *per person* in a community is in inverse ratio to the size of that community so the smaller the community the greater the malaria risk; hence towns are usually much safer than rural areas.

(3) Where camps are separate from, but not out of mosquito flight range of, the local infected community, if the latter is closer to the breeding place any increase in the size of the local community will tend to decrease the malaria risk within the camp and any reduction in its size (elimination, or elimination of all children, excepted) to increase it. Where the camp is closer to the breeding place any increase in the size of the local community will tend to increase the malaria risk within the camp.

(4) Placing of native troops in the immediate vicinity of white troops does not necessarily increase the malaria risk to the latter and may substantially reduce it.

(5) Where infected native troops and susceptible white troops have to camp together in malarious districts the native troops should be placed, where possible, between the anopheline breeding places and the white troops so that they serve as an efficient protective screen.

(6) The effects of altitude, wind and bush on anopheline behaviour are discussed.

(7) The use of, and the methods used in, anopheline surveys are described.

IX.—REFERENCES.

- ADAMS, P. C. (1940). *Ann. Trop. Med. Parasit.*, **34**, 35.
 BARBER, M. A., RICE, and BROWN (1932). *Amer. Journ. Hyg.*, **15**, 601.
 DE MEILLON, B. (1934). *Pub. S. Afric. Inst. Med. Res.*, **32**, 231.
Idem. (1937). *Ibid.*, **40**, 306.
 RIBBANDS, C. R. (1944a). *Bull. Ent. Res.*, in press.
Idem (1944b). *Ann. Trop. Med. Parasit.*, in press.
 HACKETT, L. W., RUSSELL, P. F., SCHARFF, J. W., and SENIOR WHITE, R. (1938). *Bull. Health Org., L. of N.*, **7**, 1016.

X.—APPENDIX 1.—ESTIMATION OF THE ADULT MOSQUITO POPULATION.

In West Africa, as in many other areas, nearly all the malaria risk is due to anophelines which are also house frequenters. *A. gambiae*, *A. melas*, and *A. funestus*, the three most important carriers, usually feed in houses and they remain in them, if they are suitable, for at least twelve hours after their meal. These three species are responsible for at least 95 per cent of all the military malaria and the simplest and most efficient method of estimating their prevalence is to sample native quarters (the equivalent of baited traps) in the district to be surveyed.

The anopheline density in individual rooms varies very greatly with their position and there is wide variation between the number attracted to the inhabitants of rooms on the edges of villages and the number attracted to those occupying rooms in the centre of such villages, even if the total human population is quite small. Hence, more comparable results are obtained if all rooms sampled are on the outskirts of villages or in isolated huts.

Suitable bedrooms should be chosen, preference being given to those which are dark and ill-ventilated (not because these attract more mosquitoes but because mosquitoes attracted to their occupants are more likely to remain in them when they have fed). Openings should be closed and the floor and furniture covered with white sheets. Each room should then be thoroughly flitted with an insecticide and left for a few minutes. The sheets should then be carefully removed and spread out in the open and the mosquitoes collected from them and identified (Appendix 2).

The number caught will vary with both the number and attractiveness of its human inhabitants and the sampling error cannot be eliminated but I found that when daily catches were made in such rooms, under controlled conditions, on five occasions out of every six the actual number of anophelines caught was not more than double nor less than half the average number captured by daily catches in the same room throughout one week. This standard of

accuracy is sufficient for practical purposes in view of the large day-to-day and seasonal fluctuations in the mosquito population (Ribbands, 1944a) and especially as deductions will not be drawn from results from a single room but from several rooms.

When permanent camp sites are required the results of adult survey should be supplemented by a larval survey to discover the type and position of the local breeding grounds and accurate conclusions require knowledge of the local climate and of the breeding potentialities of similar districts at other seasons.

APPENDIX 2.—THE IDENTIFICATION OF ADULT WEST AFRICAN ANOPHELINES.

Distinction between Anophelines and other Insects.—All West African anophelines (except female *A. smithi*, which is uncommon and probably harmless) can be distinguished from

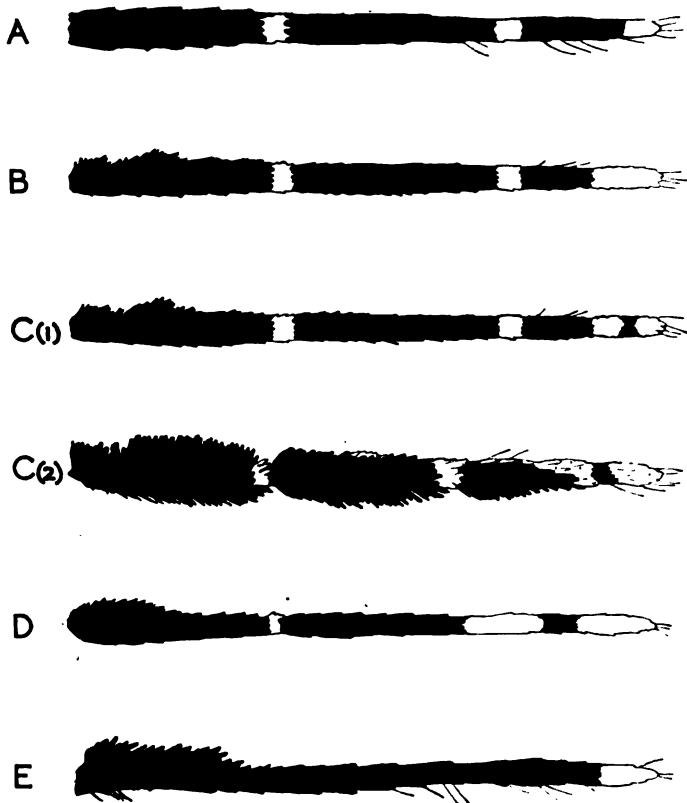


FIG. 2.

culicines by the presence of dark markings on the leading edge of their wings. This character is easily seen with the naked eye and should be known to every soldier serving in West Africa. By the use of it anophelines can be separated from all other insects caught in house catches.

Recognition of Different Species of Female Anophelines.—Twenty-four species of anophelines occur in West Africa but, for anti-malaria purposes, it is not necessary to be able to recognize all of them. The commonest and most dangerous species are the most easily recognized and a hand-lens is the only equipment required.

A. *Palps with Three Short Pale Bands* (see fig. 2).

(1) Frequently found, usually gorged with blood.—*A. funestus*. VERY DANGEROUS.

(2) Seldom found in houses, very rarely gorged with blood.—*A. rhodesiensis*. Harmless.

B. Palps with Three Pale Bands, the Terminal Band Long, the others Short.

A. gambiae and *A. melas*.¹ BOTH VERY DANGEROUS.

(*A. brunnipes* also, but this species is very rare, and also dangerous when found.)

C. Palps with Four Short Pale Bands.

(1) Palps smooth. No white markings on legs.—*A. melas*. VERY DANGEROUS.

(2) Palps shaggy. Legs with pale bands. (a) Sandy-coloured.—*A. pharænsis*. SLIGHTLY DANGEROUS. (b) Blackish.—*A. coustani* or *A. squamosus*. Harmless.

D. Palps with Three Pale Bands, Two Terminal Ones both Long.

Eight species, mainly dangerous but seldom abundant.

E. Palps with One Pale Terminal Band only.

A. nili. VERY DANGEROUS.

F. Palps not as above.

Unimportant, usually quite harmless (not illustrated).

¹Methods of distinguishing *A. gambiae* and *A. melas* are given in detail elsewhere (Ribbands, 1944b). Usually between 25 per cent and 50 per cent of specimens of *A. melas* have palps with four short pale bands—hence if 25 per cent or more of the catch have Group C palps, and the rest Group B palps, the catch can be considered predominantly *A. melas*. If all the catch have Group B palps the catch consists of *A. gambiae* only. Other proportions indicate a mixture.

A. gambiae breeds in fresh waters, usually open and often temporary. *A. melas* breeds in brackish water. *A. funestus* prefers shaded clean waters, often slightly flowing. *A. nili* breeds in running streams. *A. pharænsis* prefers weedy swamps.

SOME EXPERIENCES WITH A PARACHUTE SURGICAL UNIT.

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THE formation of Parachute Surgical Units has been the logical development of the present surgical policy of the Royal Army Medical Corps in which surgical units work in the forward areas ; and in fact the surgeon is brought to the patient as opposed to the patient being evacuated to the surgeon. Thus the long-established principle that early surgery prevents infection and accelerates ultimate recovery has been applied to modern war and even to parachute units.

Our unit, in addition to being the first parachute surgical unit, was also the first to go into action ; and so we have been fortunate in having an unique experience, particularly from a surgical standpoint. The unit, which included a surgeon and anæsthetist, is attached to a parachute field ambulance. The equipment, all of which was dropped by parachute with the unit, includes an operating table, instruments, dressings, plaster of Paris, blood plasma, sterilizer, anæsthetic equipment, drugs, medical comforts and even a bedpan. It was found sufficient to perform 145 surgical operations and about 100 dressings with a margin to spare ; such equipment as a building, transport, beds, blankets, etc., was obtained locally after dropping.

The operations performed were 136 on allied troops or prisoners, with a mortality of 2·9 per cent, and 9 on civilians. The civilians were impossible to follow up and so only troops are included in the following table. Of the civilians two died before evacuation which occurred at an average time of three days after admission. Conservative treatment was carried out on 28 troops and 65 civilians. Of these, three from the troops and eight civilians were moribund on admission and did not recover sufficiently for surgery, so the total number of admissions to the Dressing Station was 238, of which a total of 17, or 7·2 per cent, died. Of the moribund many were admitted within a few minutes of injury and their wounds were very severe. The following table illustrates the type of injury, and the immediate results of treatment amongst the troops, the cases being followed up for six weeks.

Troops treated surgically	136	
Discharged to duty within six weeks	34	(25%)
Untraced (11 known to be alive after leaving C.C.S.)	15	
Died	4	(2·9%)
Troops treated conservatively	28	
Discharged to duty within six weeks	19	
Untraced	5	
Died (moribund on admission)	3	
Total treated : 164.		Total mortality : 7 (4·3%)
Type of injury amongst troops : Single wounds	122	
Multiple wounds	42	
Flesh wounds	77	
Compound fractures	34	
Through and through bullet wounds (treated conservatively)	15	
Abdominal wounds	8	
Colon and bladder .. 2	Stomach .. 1	
Colon and small bowel .. 2	Colon and kidney .. 1	
Thoraco-abdominal .. 2		
Burns	7	
Intrathoracic wounds	5	
Eye injuries	4	
Penetrating joint wounds	3	
Urethral wounds	2	
Simple fractures	2	
Intracranial wounds	2	
Peripheral nerve centres	2	
Gross jaw wound	1	
Spinal wound (with paraplegia)	1	
Not recorded	12	

Of the cases which died following surgery two were abdominal wounds and two compound fractures, one with gas gangrene.

The cases were operated upon in an average time of ten and a half hours after injury and it is this fact which I think explains the low mortality for such severe cases. The actual time in which they were admitted was considerably less than this.

The plan of treatment was very orthodox although it was adapted to permit the dropping of the equipment by parachute. Surgical shock was treated on orthodox lines with the modification that, as the quantity of plasma was limited, those cases in which it was considered advisable were given whole blood in place of plasma. The blood was obtained from the personnel of the unit who had previously been grouped as were all combatant parachutists. Thus a large saving of space was achieved. As regards chemotherapy, every case received a prophylactic course of sulphanilamide or sulphapyridine in addition to its introduction into every wound. The anæsthetic principally used was pentothal, supplemented when necessary with chloroform and ether mixture.

The surgery of flesh wounds was complete excision, dusting with sulphanilamide powder and the laying on of vaseline or dry gauze, linen thread being used for ligatures. Although the cases were obtained early it was not considered advisable to perform primary suture in view of the long line of evacuation. Uncomplicated through and through bullet wounds were treated conservatively, sulphanilamide powder being introduced into the track with a probe and no excision being performed, not even of the skin edge. The results were satisfactory, twelve of the fifteen cases so treated being discharged from hospital to duty in fourteen days and the remaining three within six weeks. Due to the limited supply of plaster no case of soft tissue wound was placed in plaster.

Compound fractures were treated on the same lines as flesh wounds and enclosed in complete plasters; they were not evacuated for at least three days. Compound fractures of the femur were the exception, a Thomas' splint with adhesive plaster skin traction being used in these cases.

Of the eight abdominal wounds six lived, the deaths being a wound of lung, liver and colon and a gross wound of small intestine and its mesentery. The treatment adopted was suture of perforations with resection in one case and colostomy in wounds of the colon either above or at the site of injury. The liver wounds and the one renal were packed; bladder wounds and the two urethral wounds were treated by suprapubic cystostomy. In all cases sulphanilamide powder was placed intraperitoneally in the region of the injured viscera. Abdominal cavity drainage was only adopted in the case of colonic wounds but drainage of the abdominal wall was instituted in every case.

Intrathoracic wounds were treated by excision of the chest wall wound with closure of the muscle layers with interrupted sutures, the skin being left open. In every case the pleural cavity was aspirated and in two cases with a large external wound, the bleeding from the lung was controlled by suture of the lung. In three cases the pleura was not drained and these travelled much better than the two with pleural drains although they had to be aspirated at intervals during evacuation.

Burns were treated by thorough cleansing, dusting with sulphanilamide powder and a gauze dressing; joint wounds by excision of the wound and early movements. Eye wounds consisted principally of cases of intra-ocular foreign bodies which were evacuated as soon as possible to the base. One case of gross injury was treated by enucleation of the eye.

The one case of gross jaw injury was treated by tracheotomy and wound toilet without excision. Partial suture particularly of the buccal mucosa was performed and the patient evacuated to the facio-maxillary unit at the base. The case of spinal wound was found to have a raised pressure and blood was present in the cerebrospinal fluid on lumbar puncture. In view of this and in the presence of a complete paraplegia a laminectomy was performed, several intrathecal foreign bodies removed and the torn dura mater sutured; intermittent catheterization was used in this case. He was known to be alive on evacuation from a General Hospital. No attempt was made to suture the two cases of divided peripheral nerves. The

two intracranial wounds were excised, depressed bone elevated or removed, foreign bodies removed, if seen, and the torn dura mater sutured, sulphanilamide powder being placed extradurally; both lived, one returning to duty within six weeks.

Two patients developed gas gangrene, one before and one after excision. The first was treated by early amputation and lived, the second was of very rapid onset and died within twelve hours; this was a gross crush injury of thigh and would probably have survived if an amputation instead of wound excision had been performed initially, particularly as the shock was under control. Only one other limb was amputated and this was for a gross injury of foot and ankle.

DISCUSSION AND CONCLUSIONS.

(1) Surgery in a forward area is possible, even with parachute troops, and seems to be justified by results. The employment of more surgeons in the advanced and main dressing stations is suggested.

(2) Pressure of work necessitates conservative treatment in many cases, 93 or 39 per cent of our series, and uncomplicated through and through bullet wounds benefit by avoiding surgery as is shown by their rapid return to duty if not operated on.

(3) Again in forward areas without X-rays much time may be wasted looking for foreign bodies, usually without success. Of our cases with suspected foreign bodies only about 25 per cent were removed and in many of these additional foreign bodies were left *in situ*. Provided these wounds are not sutured the presence of the foreign body does not appear to delay healing unduly and it can always be removed under the more advantageous conditions of the base hospital. These foreign bodies were remarkable for their variety and size. One weighing 8½ pounds was removed from the thigh and it had not fractured the femur.

(4) We have noted that badly wounded cases which are to be kept for long near the battle area require heavy doses of sedative and this has led in some instances to evacuation before the optimum time.

SUMMARY.

An outline of the work of a parachute surgical unit is given.

Early surgery in an average time of ten and a half hours from wounding gave a low mortality and morbidity considering the nature of the injuries (4 of 136, or 2·9 per cent of the troops operated on).

THE DIVISIONAL FIELD AMBULANCE IN MOBILE WARFARE¹

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INTRODUCTION.

THIS article is submitted in the hope that it will be of assistance to such medical units as have not yet had the advantage of actual participation in active mobile warfare as it is felt that the experience gained and many of the lessons learnt in the Western Desert will apply whenever and wherever swift-moving warfare is the order of the day.

The old organization of a Field Ambulance—the heavy type as distinct from the Light Field Ambulance—does not lend itself to the present-day highly mobile mechanized operations and constantly changing tactical situations which are characteristic of the more active phases of desert warfare.

An endeavour has been made, therefore, to reorganize the ordinary Field Ambulance so that it embodies what are considered, in the light of two years' experience in the desert, the better points of the Light Field Ambulance while retaining the more desirable of its infantry counterpart.

The result, it is submitted, produces a medical unit which has the tactical manœuvrability and operational adaptability of the Light, allied to the medical efficiency and capacity for treatment and care of casualties which are the main advantages of the Heavy Field Ambulance.

It is further submitted that this compromise would be equally efficient working with Infantry Divisions or Mechanized Divisions or even, should it be called upon to do so, with Armoured Divisions.

ADMINISTRATIVE.

A.—ORGANIZATION.

(1) THE COMPANIES.

Considerations.—Firstly, constant calls are made on a Field Ambulance for "detachments" of less than a Company in strength. Secondly, owing to the distances involved, medical posts working in echelon are often necessary under battle conditions. Thirdly, there is no role for the number of stretcher bearers allowed by War Establishment in Western Desert warfare. They are never used behind the R.A.P.

Solutions.—The two Companies, therefore, are sub-divided into three Sections each. viz. :—

Nos. 1 and 2, Light Sections.

(a) *Personnel :*

1 Medical Officer, R.A.M.C.

1 Serjeant, R.A.M.C.

1 Driver, R.A.S.C.

9 Other Ranks, R.A.M.C. (including men trained as Cook, Clerk and N.O.s).

(b) *Transport :*

1 three-ton vehicle.

2 ambulance cars.

1 light vehicle for Medical Officer.

(c) *Accommodation :*

1 40 by 20 feet penthouse.

¹It will be appreciated that many of the principles suggested in this article have already been embodied in the new organization. It should be borne in mind, however, that tactical dispositions must vary with the nature of the terrain encountered. Shelters, similar in type to those referred to as penthouses in page 170 of the article, are shortly to be added to the equipment of Field Ambulances and Field Dressing Stations.

(d) Equipment :

- (1) Drugs—Morphia—Chloroform (including small amounts of frequently used drugs and medicines).
- (2) Surgical and Shell Dressing Haversacks—General Dressings—plus.
- (3) Monkey Box—Plasma—Splints (Thomas, Cramer Wire, &c.)—Pannier, G.S.—Bed Pans—Urine Bottles—Hot Water Bottles.
- (4) Cooking Equipment—Lamp—Stretchers—Trestle Tables—Blankets.
- (5) Medical Comforts Pannier—Primus Stove—Hot Box—1 gallon Thermos Containers.

The H.Q.s of the Companies form Light A.D.S.s and consist of :

*No. 3 (A.D.S.) Section.**(a) Personnel :*

- 1 Medical Officer, R.A.M.C.
- 1 Staff Serjeant, R.A.M.C.
- 3 Corporals, R.A.M.C. (Cook, Clerk and N.O.).
- 14 Other Ranks, R.A.M.C.

(b) Transport :

- 2 three-ton vehicles.
- 1 15-cwt. or Jeep (Company Commander).
- 2 or 3 ambulance cars.
- 1 water cart.

(c) Accommodation :

- 1 40 by 40 feet penthouse.

(d) Equipment :

The major part of a normal A.D.S. equipment, as laid down in G. 1098 and I. 1248 scales.

The Companies have thus been lightened and reduced to a total of thirty-eight O.R.s, R.A.M.C., and these figures are as low as they can reasonably be brought, while sixteen stretcher bearers are withdrawn from each Company on to H.Q.

This reorganization of the two Companies into four Light Sections and two A.D.S.s enables them to be used singly or collectively, as the tactical situation demands, whilst still retaining their operational independence.

(2) THE M.D.S.

Considerations.—The H.Q. Company forming the M.D.S., in mobile warfare, must be capable of : Firstly, rapid movement. Secondly, giving treatment, shelter from the elements and food for from 100 to 200 patients at any one time. Thirdly, moving complete in one bound—the question of sending back for remaining personnel does not arise in the desert.

Solutions.—The H.Q. load-carrying transport has been allotted to various operational duties and the functioning of the M.D.S. is probably best described by the table below which demonstrates how this has been done. Personnel must, as far as possible, always travel in the same lorries and must know which one it is and where to find it, either in Camp, in Column or in Desert Formation.

TABLE.

<i>Vehicle No.</i>	<i>Load Carried</i>
1	Company office.
2	Cooks' wagon.
3	Dental and officers' mess.
4	M.I. and reception (40 by 40 feet penthouse).
5	Surgical, operational theatre and resuscitation (40 by 40 feet penthouse).
6	General ward (40 by 40 feet penthouse).
7	Medical stores (I.1248). (Reserve penthouse.)
8	Q.M.—Miscellaneous stores, clothing, G.1098, &c.
9	Q.M.—Reserve rations and men's canteen.
10	General utility—personnel.
11	Workshops.

(a) PERSONNEL.

(i) *Stretcher Bearers*.—The Companies have been lightened by thirty-two stretcher bearers and these are now on the strength of H.Q. In the desert, under mobile conditions, Field Ambulances often run far ahead of their source of supply of medical and ordnance equipment, &c., and, because of the "time lag" involved in replenishment, larger stocks of these have to be carried, not to mention very considerable quantities of all other stores (additional food, water, &c.). It will be seen, therefore, that the unit transport moves loaded to capacity. This raises the question of the carriage of S.B. personnel.

In practice, it is found that there is a considerable saving in manpower, and the efficiency of the unit is increased, if the unit works approximately 30 O.Rs, R.A.M.C. (S.B. personnel) understrength. This is arranged by sending men to the L.O.B. Camp or noting on A.F. W. 3009a (Field Return—Other Ranks) that reinforcements for the deficiencies stated are not required. Thus, the number of "bodies" and their kits which the unit has to move and maintain is temporarily reduced.

It is realized, nevertheless, that one cannot dispense with the services of stretcher bearers in warfare in mountainous or over difficult country, when the R.A.P. may have to be cleared by R.A.M.C. S.B.s. When carried, however, they are on the strength of H.Q. Company and can be rushed when and where they are needed in H.Q. transport.

(ii) *Officers*.—Rarely, during battle, are all the Company Sections engaged, and Medical Officers of those in reserve are available for work in the M.D.S.

In practice, it is found that it is essential for the second in command to be on the strength of H.Q. Company in order that the C.O. may visit forward units while leaving a responsible officer in charge during his absence. Alternatively, he may depute a similar important task to his second in command with full confidence in his tactical judgment, &c., rather than employ as Adjutant a junior inexperienced officer. In addition, a potential Field Ambulance Commander is being trained. This policy is prompted by the fact that such journeys of liaison with one's own unit and, at times even with Brigade and Division, may require an absence from unit H.Q. of over twenty-four hours. One Company, therefore, is commanded by a Major and the other by a senior Captain.

(iii) *Surgical Teams*.—The presence of a Mobile Surgical Team with a Field Ambulance is an enormous asset. They are now completely mobile and self-contained and work in the closest liaison with the Field Ambulance, selecting cases for operation, while the Field Ambulance is responsible for after-treatment, evacuation, &c.

B.—ACCOMMODATION.

(1) TENTS.

The G. 1098 scale of tentage has proved to be unsuitable and inadequate for the task which it is called upon to perform. Their only use is found to be in the more static phases, when two per Company and three or four R.D. tents on H.Q. are an advantage. E.P.I.P. tents make excellent operation theatres in these circumstances.

During the active phases tents are not used at all and small "lean-to" penthouses, which roll up along the sides of vehicles when travelling, are a tremendous asset in dispensing with them.

(2) PENTHOUSES.—

(a) *40 by 40 feet Canvas Penthouses*.—These are found to be the complete answer when mobility and extensive accommodation, combined with ease and rapidity of erection, are required. The 40 by 40 feet canvas is "roomy," easily erected and capable of holding 30 to 40 lying patients. The fact that these "wards" are erected over the vehicle in which they travel is a great advantage as the latter thus becomes a storeroom and is unloaded only to the extent of laying out essential dressings, drugs, equipment, &c. (figs. 1 and 2).

Normally, the M.D.S. consists of four operational 40 by 40 feet penthouses while the accommodation of Sections in reserve can also be utilized where necessary.

(b) *40 by 20 feet Canvas Penthouses.*—These are designed for use by Light Sections and are half a 40 by 40 feet canvas. They are extremely quick to erect and dismantle. They give cover to approximately 20 to 25 stretcher cases and almost completely obviate the unloading of the Section vehicle.

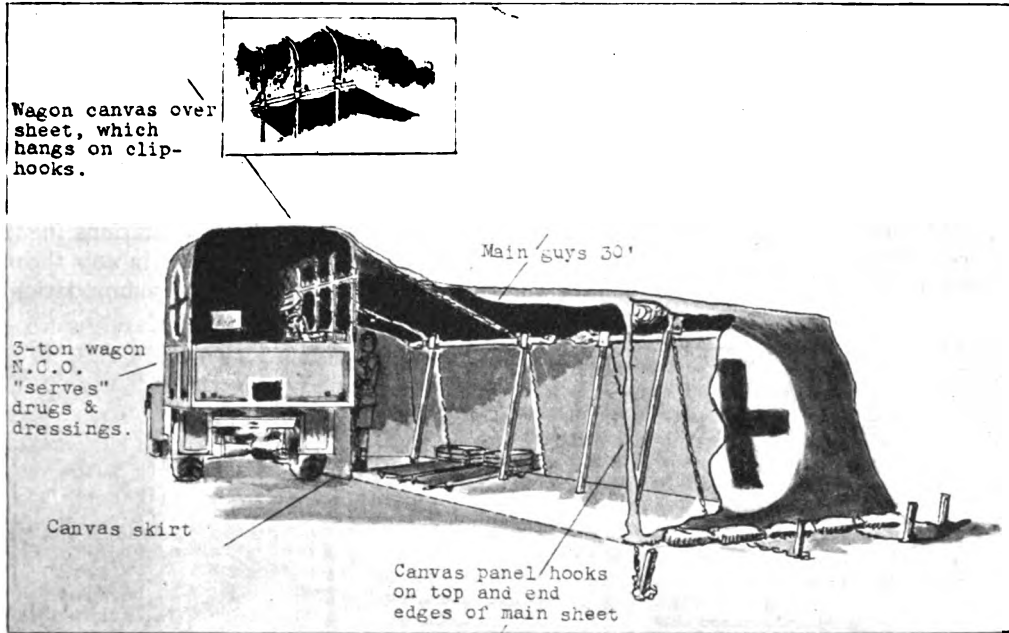


FIG. 1.—Rear sectional view, 40' x 20'. Company penthouse.

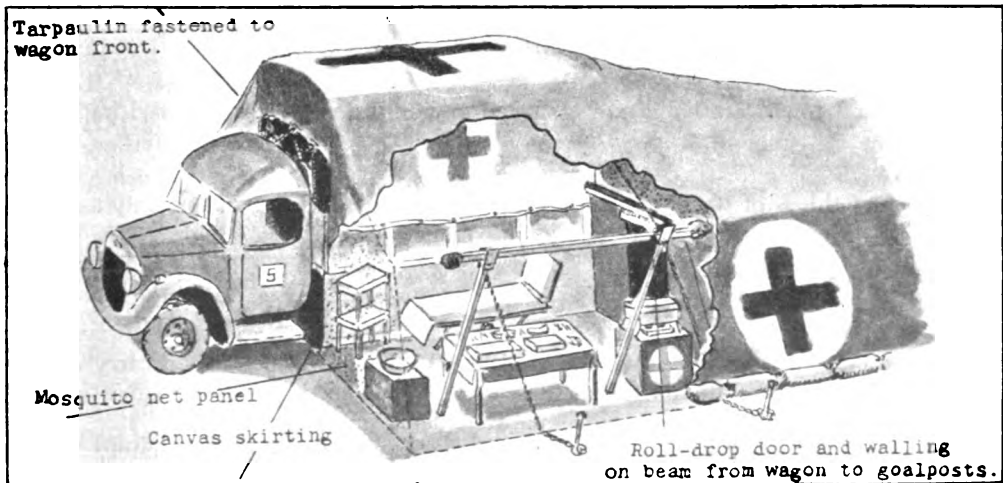


FIG. 2.—40' x 40' Canvas penthouse. Sectional view, 40' x 40' penthouse, showing operating theatre.

For 40' x 40' penthouse: Goalposts, sets 6; tarpaulin 40' x 40' 1; odd canvas for blackout; sandbags 70; rope 1" (main guys) 70'; rope 3/4" (small guys) 120'; pegs 18. *For 40' x 20' penthouse:* Goalposts, sets 3; tarpaulin 40' x 20' 1; odd canvas for blackout; sandbags 40; rope 1" (main guys) 50'; rope 3/4" (small guys) 60'; pegs 12; clip-hooks 5.

The diagrams and sketches of these penthouse structures will give much more information concerning them than the written word.

(c) *General*.—Personnel become very expert in the erection of the penthouse, both by day and night, and it is possible for the Light Sections to have accommodation ready to take patients within five to ten minutes of arrival; while the large 40 by 40 feet "wards" require about ten to fifteen minutes to put up. These times do not include the complete sand-bagging of the walls, but do enable casualties to be treated while this work is being carried out. The times taken to dismantle them are rather less than half those of erection.

They are extremely weatherproof and, although inclined to be hot under desert conditions during the summer months, are comfortably warm in winter. Blackout curtains are permanently fitted to the canvasses while odd canvas is used to surround the open space under the vehicle.

In the surgical penthouse, when no surgical team is available, an area can be "walled off" and turned into an efficient operating theatre for life-saving or minor operations (fig. 2).

It is submitted that these structures may well have a very definite place in any theatre of mobile operations while, in Continental warfare, when suitable housing accommodation is

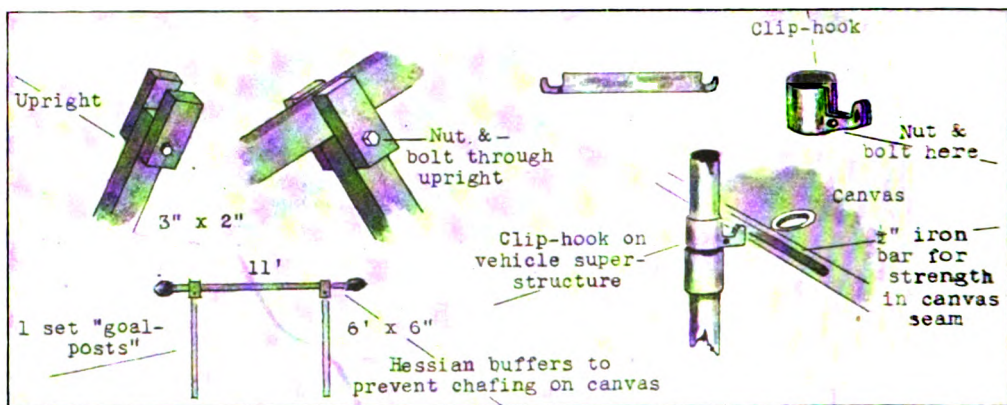


FIG. 3.—Details of building materials for penthouses.

not available and towns are liable to be shelled or bombed, they can be used in the open countryside.

C.—TRANSPORT.

In the desert this is of paramount importance and a Field Ambulance is only as good as its transport. Every vehicle has to be self-supporting.

(1) RESERVE SUPPLIES.

Each vehicle carries 32 gallons of spare petrol, in addition to tanks full, at least 18 gallons of spare water in camel tanks or 2 gallon containers, and three days reserve vehicle rations for all personnel travelling on the vehicle. Penthouse vehicles each carry a tapped 44 gallon water drum for patients and medical use. It has been proved time and time again that all vehicles have to be capable of a separate existence.

The average consumption of petrol by load-carrying vehicles is approximately 5 m.p.g., and vehicles have to carry their own spare petrol, as no petrol lorry is available, while replenishment is often difficult.

(2) MAINTENANCE.

Constant supervision and interest by the Transport Officer, as well as by the Field Ambulance and Company Commanders, is essential. Strict discipline with regard to drivers' daily maintenance tasks must be insisted upon.

Too much reliance on the present R.A.S.C. Workshops is unsatisfactory as they are often not in the vicinity of the unit when one needs them. Besides, they have "their hands full" keeping their own transport on the road. It is necessary, therefore, for the Transport Section lorry to become what is, in fact, a small Workshop with a reasonable supply of spares, especially springs. These latter were a great source of trouble in the Western Desert. When a larger stock than normal is obtained each vehicle is made to carry its own spare springs. If adequate minor spares are not carried it often means the vehicle is off the road for days and weeks at a time waiting for a replacement from Base. Therefore the Transport Section should endeavour to be relatively independent, making as few claims as possible on the Brigade R.A.S.C. Company, but every endeavour should be made to have every vehicle inspected each month in the latter's Workshops.

(3) TRANSPORT DRILL.

Reference has already been made to the necessity for every driver and every man in the unit to know where his vehicle is located in camp or travels on the move. A stereotyped drill is necessary for both these manoeuvres. Apart from minor modifications indicated by local features there is no reason to grossly alter the "clockface" layout.

On arrival on a camp site, the Orderly Room and Cookhouse proceed first and, once they are placed, other vehicles automatically take up their positions from them, i.e. operational penthouse vehicles in the front along the axis track; "Q" department on the one side and transport on the other; H.Q. cookhouse in the middle, H.Q. office and Officers' lines at the rear and the reserve Company in rear of Officers' lines. When possible, 100 yards dispersal between vehicles or entities is maintained.

Similarly, vehicle drivers are taught to assume their correct position in Column or Desert Formation as soon as their vehicles are ready after an order to move has been given.

On the move in Column, H.Q. vehicles proceed first in their operational order (see M.D.S.), spare Ambulance Cars, &c., next, and the Companies in rear.

(4) ESTABLISHMENT.

(1) *Load-Carrying Transport*.—The special Middle East Establishment for desert warfare of nineteen 3-tonners, as against four 3-tonners and fifteen 30-cwts., as per War Establishment, is very adequate. It makes the organization described, with its many advantages, possible, in that the whole unit is entirely mobile.

(2) *Trailers*.—Some units which have been in the desert for a considerable time, have "acquired" trailers made from derelict vehicles with the help of Ordnance or R.A.S.C. Workshops. These are invaluable as an Office, Officers' Mess, Canteen, &c., but are an adjunct, not an essential.

(3) *Ambulance Cars*.—The number of ambulance cars—eight—on the vehicle Establishment of a Field Ambulance, does not meet the requirements of mobile desert warfare, where a long line of evacuation extending up to as much as 40 miles (at an average speed of 5 m.p.h.) is the rule rather than the exception during active operations. Extensive use must be made of returning "B" echelon vehicles to evacuate walking and sitting wounded.

The fact that ambulance cars can be sent up to R.A.P.s is a great advantage but the feeling that the unit will not have enough cars available to clear its own sections and/or A.D.S. is a constant source of anxiety—especially during a withdrawal.

The Establishment of eight cars, which catered for the distance of 6 to 10 miles between the Car Post or A.D.S. and M.D.S. in the war of 1914–18, is now required to maintain a line of evacuation often four or five times this length.

It is understood that this Establishment is very shortly to be increased to twelve or fourteen ambulance cars and this should prove satisfactory. The Austin K.2 type is extremely reliable but spring breakages are enormous over rough country and they are not as suitable as the light Ford or Dodge ambulance car for work up to the R.A.P. and for patrol work with Sections.

It is suggested that an Establishment of, say, six heavy Austin K.2 type and six or eight light 2-stretcher ambulance cars would more nearly meet the requirements; the number rather than the capacity of vehicles available being of greater importance.

D.—EVACUATION.

(1) *By Ambulance Car.*—Reference has been made in the preceding paragraph to the evacuation of patients from R.A.P. to the forward Medical Posts, thence to the M.D.S. Because night driving in the open desert is most hazardous, evacuation of patients by night is well-nigh impossible except in bright moonlight and then only as a life-saving measure with a driver who knows the desert and route very well indeed.

On a long line of evacuation it is essential, therefore, to despatch casualties from one stage to another to reach the latter before dark. Experience has shown that medical posts, where the patient may be seen by a Medical Officer or accommodated for the night, should be located within 30 miles, or four hours' journey, whichever is the less.

M.A.C. cars evacuate from the M.D.S. to the Corps M.D.S. or C.C.S. A close liaison between the M.A.C. representative (generally a junior Officer, R.A.S.C.) and the M.D.S. is essential and it is through the M.A.C. channels that emergency supplies of drugs, dressings, stretchers, blankets and ordnance equipment are obtained by forward medical units.

(2) *By Air.*—If the M.D.S. is near an aerodrome on which Ambulance, Transport or Bomber 'planes can land, this is, of course, the method of choice, for seriously wounded cases. The number of hours taken by this method to reach a major medical unit often corresponds to the number of days taken by ambulance car, train or boat, with obvious advantage to the patient.

E.—GENEVA CONVENTION.

Medical units in the desert, broadly speaking, receive, at the hands of the enemy, reasonable consideration for the terms of the Geneva Convention but, to obtain this consideration, it is essential to leave no room for error. Small red crosses either on flags, ambulance cars or vehicles are useless as they cannot easily be seen from the air or from a distance. Six feet red crosses or even bigger are painted on the penthouses. Large ground crosses are displayed, while six or nine feet square red cross flags are flown at the A.D.S. and M.D.S. Ambulance Cars and tarpaulins covering vehicles are marked by four feet red crosses. It is noteworthy that the size of the white circle is of greater importance, from a visibility point of view, than the size of the red cross.

Red cross flags of the size suggested have to be manufactured within the unit as they are not normally obtainable through official sources.

F.—INTER-COMMUNICATION.

The Field Ambulance which is not equipped with wireless is considerably handicapped. Telephonic communication is almost invariably lost immediately active operations start while "contact" officers may not be able to get through—this is especially so in a withdrawal.

The unit is, therefore, very dependent concerning the whereabouts of its forward elements on information gleaned from returning ambulance cars and personal liaison with them and Brigade or Division.

TACTICAL.

In modern warfare campaigns are divided up into static phases of reorganization and preparation for attack and periods of highly mobile warfare. It is to this latter end that all training must be directed as it is then that the efficiency of a medical unit is put to the test. In mobile operations a Field Medical Unit which cannot move rapidly, completely and efficiently in its own transport is a liability to itself and its formation.

A.—STATIC PHASE.

(1) THE COMPANIES.

During the static phase the Companies of a Field Ambulance, in turn, form a full A.D.S. serving a Brigade, about 2 to 3 miles in rear of the forward troops. Sections are temporarily detached for use with mobile columns of all arms as occasion requires.

(2) THE M.D.S.

This is normally situated 10 to 20 miles in rear of the A.D.S. and generally serves two Brigades. One M.D.S. of a Division may well be employed resting, many miles in the rear, forming a Divisional Convalescent Camp.

B.—ACTIVE PHASE.

The Advance.

(1) THE COMPANIES.

In open warfare, once the stage of movement is commenced, a Company is to all intents and purposes Brigaded; the A.D.M.S. and O.C. Field Ambulance retaining, in practice, only a small measure of control. Its task, to evacuate the casualties of its Brigade wherever they may occur, necessitates that it never loses contact with the advancing formation, moving in accordance with operational needs, either as a whole or by Sections. The Company or part thereof should, therefore, be in the general area of Main Brigade H.Q.

If the tactical situation demands, part or the whole of the reserve Company proceeds forward to "leap-frog" or augment the first Company.

(2) THE M.D.S.

One M.D.S., to which a Surgical Team and possibly a Blood Transfusion Unit are attached, serves the A.D.S.s of at least two Brigades, until such time as the advance has left it at 20 to 30 miles in rear, when a reserve M.D.S. of the Division, taking with it the Surgical Team and Blood Transfusion Unit, "leap-frogs" it in accordance with operational demands under Divisional arrangements.

In order to facilitate inter-communication, the main functioning M.D.S. should be in the general area of Divisional Rear H.Q.

The Withdrawal.

(1) THE COMPANIES.

Sections are used to "leap-frog" each other in echelon, in accordance with the tactical situation; thus producing a series of small very mobile medical posts which can close and fall back at the shortest possible notice.

(2) THE M.D.S.

It is essential under these conditions to keep the M.D.S. as light as is compatible with efficiency. This is achieved by despatching the majority of non-operational vehicles well to the rear, e.g. "Q" department, Workshops, H.Q. Office, Messes, &c., retaining only such penthouse vehicles, cooking facilities and light trucks or staff cars as are necessary.

The M.D.S. proper thus consists of about three vehicles and, of these, only such as it is utterly essential to "open" are temporarily immobilized by having penthouses erected over them.

C.—GENERAL.

In practice, it is found that the O.C. Field Ambulance and A.D.M.S. have relatively little control over the forward Company during battle. The Company Commander, working in close liaison with Brigade, must have full authority to dispose of his Company and/or Sections in accordance with the rapidly changing tactical situations, without being hampered by the "time-lag" involved by referring the matter back to O.C. Field Ambulance or A.D.M.S.

In an advance the tactical handling of Divisional Medical units is comparatively easy. In a withdrawal, it is always difficult; the important consideration being the speed with

which casualties can be despatched along the line of evacuation and this is dependent upon the number of ambulance cars available for this duty.

SUMMARY.

The article endeavours to demonstrate the great importance to Field Medical Units in mobile warfare of :—

- (1) Transport and, above all, *mobility*.
- (2) The provision of adequate and suitable accommodation for patients by penthouses, such as is not provided by the G. 1098 scale of Field Ambulance tentage.
- (3) Operational adaptability and tactical manœuvrability made possible by the organization of the Companies into independent Sections, while at the same time retaining the advantage of Company formation.
- (4) Self-sufficiency and the ability to function efficiently and maintain an independent existence if temporarily cut off from supplies—medical, p.o.l. food and water—for two to three days.
- (5) Training and teamwork.

Finally, the article submits that the Field Ambulance, so organized, can function with equal efficiency under the diverse conditions encountered in either close or open modern warfare.

My thanks are due to Colonel J. Melvin, *O.B.E.*, *M.C.*, *A.D.M.S.*, Division, for permission to forward this article for publication and to Serjeant R. R. R. Martin, *R.A.M.C.*, for the care and trouble he has taken in illustrating it.

THE IMPORTANCE OF FAILURE OF CONCENTRATION IN THE ACUTE WAR NEUROSIS SYNDROME.

BY MAJOR R. F. TREDGOLD,

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THE term acute war neurosis was applied by Sargant and Slater (1940) to a definite syndrome occurring in a number of men shortly after the evacuation of Dunkirk and consisting of the symptoms of an anxiety attack—apprehension, insomnia, terrifying dreams and a feeling of inner unrest with possibly additional hysterical features, together with those of physical exhaustion—pallor, tension or alternatively apathy of expression and a coarse tremor.

This syndrome was regarded as distinct enough to warrant description under a separate heading ; it was stated by these authors to differ from any seen previously by them in peace and war although, as they imply by calling it "acute shell shock," it probably existed in the last war (1914–18). In fact a description of a similar condition after Zeppelin raids by Smith may be consulted (1916) ; insomnia, nightmares, apprehension and exhaustion were present and it may be noted that in some cases there resulted psychoses which needed certification. Others complained of "feeling dazed," "in a muddle" or "quite unable to do housework."

Moreover this syndrome appears very similar to conditions described by numerous witnesses whose evidence was given to the War Office Committee of Inquiry on Shell Shock. In their report (1922) cases were classed as (i) commotional, rare and actually due to exposure to blast, with or without cerebral concussion, and (ii) emotional, frequent, and due to numerous physical and, more important, mental factors, and occurring at times without any exposure to shells. It was admitted that a mild degree of commotional shock might be accompanied by emotional.

More recently Mira (1939) in a study of the War of the Spanish Intervention noted similar cases and also a more malignant type which he named psychorrhexis ; and Ross (1941) and Bennet (1941) listed headache, failure of concentration, forgetfulness, insomnia and dreams.

FAILURE OF CONCENTRATION.

This symptom, it may be noted, was not mentioned specifically by Sargant and Slater and only by implication by Smith. Among the cases quoted to the War Office Inquiry it was observed that "mental inertia" was one of the symptoms in commotional states ; the picture, on the other hand, of the emotional type was one of anxiety or terror and it is of course obvious that in such cases there would be inability to concentrate. Nevertheless it may be remarked that it was again not specifically mentioned by more than a few witnesses ; but its presence is clearly implied by recognizing the need for the education of the power of concentration (as laid down in Appendix 3 of the report) and for adequate occupational therapy for convalescents.

An increasing loss of efficiency and alertness was noted by several witnesses to be a symptom of an impending attack ; this has again been described by Blakeslee (1941) as a pre-neurotic type.

Ross and Bennet as stated above noted failure of concentration as a common enough symptom in an anxiety attack but apart from these little attention seems to have been paid to it in this connexion.

OBSERVATIONS.

In view therefore of the regular, though perhaps not great, appearance of such a symptom in the out-patients of a military psychiatrist, it seemed that it might be of interest to investigate it in slightly more detail.

Some forty cases were observed, over approximately a year, who showed failure of concentration as a major complaint; every one had a history of severe bombing and of some degree of exhaustion. These cases fell into three groups:—

(1) *Residual*.—Those who had already, as far as could be ascertained, suffered from a full fledged acute war neurosis, as described above, which had developed rapidly after their exposure to bombing. Most of these had been treated in hospital and had been sent back to duty, apparently fit. They were now seen eight to eighteen months after the start of their original illness; the picture they showed differed from their original attack in that their principal complaint was now inability to concentrate; this was at times accompanied by mild anxiety, often apparently due to the man's realization of his own inefficiency, an increased irritability or sensibility to criticism; sometimes by insomnia, with battle dreams and usually a coarse tremor of the outstretched hands. Some cases showed such extreme terror on hearing air-raid sirens or aeroplanes, even if friendly, that they were constrained to dive under beds although they appreciated there was no real danger; this occurred even in men whose confidence in their recovery and stability had appeared quite adequate. This condition was actually only seen in a few cases but may have been more prevalent since in the nature of things they were often not exposed even to sirens. Other cases however showed no symptoms except failure of concentration. Of twenty-four cases, fifteen showed no evidence of a previously abnormal personality.

This symptom was, as might be expected, more common among units such as the R.A.C. where a considerable degree of concentration was normally required, or in men employed over long hours on responsible clerical work; and it was generally found that the original complaint came from the man himself, as he observed his own short-comings, and was thereafter corroborated by his superiors. Reports to the effect that "he seems to be unable to hold down his job nowadays, though he obviously tries," "not so reliable as he used to be," "quite unable to concentrate or take decisions," testified to the change in the man's abilities and, generally, to the high opinion previously held of him by his superiors—an uncommon enough finding in psychiatric cases.

Inquiry revealed the presence of a past anxiety state even in those who now showed no other symptom than failure of concentration.

This condition may be compared to a state seen in children after air-raids and described by Mons (1941) as consisting of inability to occupy themselves, fear of responsibility of making decisions, not knowing what they want.

The following may be quoted as typical examples of this condition:—

EXAMPLES:—

Case 1.—A Serjeant, aged 24, previously normal, responsible and conscientious. Severe anxiety state and gunshot wound of abdomen at Dunkirk for which he spent some six months in hospital and then returned to duty. Seen a year later with failure of concentration, irritability, insomnia and battle dreams and marked tremor. Admitted he was quite unable to get a grip on his work or to be interested for long—Boarded out.

Case 2.—A Corporal, aged 27, previously lacked self-confidence. Severely dive-bombed, with B.E.F. and developed acute anxiety state. Improved in some months. Seen a year later, continual minor inefficiencies reported at unit; irritable, lacked concentration, confidence, initiative and patience; fine tremor—Boarded out.

Case 3.—A Serjeant, aged 32, developed acute anxiety attack when bombed; seen three months later and complained of being able only to do simple jobs as he could not concentrate; memory poor; liable to be very apprehensive of air-raid sirens; irritable, tremor—improving somewhat and remains at simple job.

(2) *Insidious Cases*.—These showed no evidence of a previous anxiety attack but complained of failure of concentration, irritability and restlessness with mild anxiety, all gradually increasing, some months after exposure to bombing. Insomnia and battle dreams were also present in some and, at times, hysterical symptoms.

These cases were less common and it is of interest to note that, of the ten seen, three were officers and seven showed no evidence of a previously abnormal personality.

EXAMPLES :—

Case 4.—Lieutenant, aged 29, previously normal. Severely bombed; considerable over-work. After six months developed anxiety with failure of concentration and irritability so that work was impossible. Improved with three months' rest in hospital and remained well.

Case 5.—Signalman, aged 23, previously normal. Severely bombed in France; gradually increasing difficulty in concentration; irritability and insomnia. Said to be apathetic and easily flustered. Anxiety developing from his inefficiency. Improved with reassurance and temporary light duty under supervision.

Case 6.—Lieutenant, aged 24, previously normal, anxiety and irritability gradually increasing. Some symptoms of effort syndrome; inability to concentrate which benefited from gradually increasing mental exercise. Still nervous on hearing planes but otherwise capable.

(3) *Depressives.*—Some men, whose symptoms began either insidiously or acutely, developed on top of these symptoms a depressive phase which included emotional instability and suicidal attempts; and it could be seen that the outbreak of this depression was generally precipitated by a minor stimulus, such as a mild reprimand, which to the patient appeared the last straw after a period of intolerable irritation.

EXAMPLES :—

Case 7.—Corporal R.A.F., aged 33, previously normal. Severely bombed and blown up in "Lancastria"—anxiety, irritability and failure of concentration increasing within a few days. Discipline and formality irksome. Mild reprimand by C.O. led to suicidal attempt in depressive phase. Recovered; returned to civil life.

Case 8.—Airman (ground staff), aged 31, always shy and reserved. Severely bombed in B.E.F.; slight injury to foot; gradually increasing anxiety with irritability, restlessness, failure to concentrate and insomnia with battle dreams. Depressive phase developed seven months later. This disappeared but irritability and inability to concentrate remained. Discharged to civil life.

Case 9.—Private R.A.S.C., previously steady and reliable. Bombed at Dunkirk; gradually increasing irritability, lack of concentration and emotional instability for five months, then absented himself. Was eventually arrested and developed reactive depression. Marked fear of bombs and tremor. Recovered slowly. Discharged to civil life.

Of ten cases five showed no evidence of a previously abnormal personality and some showed additional hysterical symptoms; the significance of this will be later discussed.

In all these cases the type of failure of concentration was very similar and may be described as an early tiring of attention. Thus the patient would have no difficulty in starting his day's work but became slow, tired and unreliable by afternoon. On some test such as the R.E.C.I. Matrices he would start quickly and correctly but would unduly soon complain that he was unable to collect his thoughts or to make a decision and become somewhat confused, anxious or impetuous. After a while he could carry on where he had given up and go on moderately well, particularly if some other topic had meanwhile been introduced. The patient's self-confidence began correspondingly to fail but it was noteworthy that in most a high degree of conscientiousness was seen.

ÆTIOLOGY.

The ætiology of the acute war neurosis was discussed in some detail by Sargant and Slater, who pointed out that men of reasonably sound personality might break down under a severe enough strain. Although constitutional factors were occasionally present, many cases existed whose soundness had at least been adequate to adapt to civil life and enlistment in the Army. They stressed the importance of the co-ordination of physical and mental strain in which must be remembered not only the sights of war but the continued frustration of retreat.

In this connexion it may be remarked that Marshal Ney, whose bravery was a proverb, did appear to suffer from the effects of the retreat from Moscow which had demanded—and obtained from him—an incredible degree of physical and mental effort; his later symp-

toms of irritability, indecision and failure to concentrate had a profound influence on his master's final campaigns. So that it is perhaps reasonable to agree that every individual has his breaking point. The reason why some break in situations where others survive is probably to be found in the argument that identical conditions may appear entirely different to two different men and that their importance, as Benton (1921) has stated, lies rather in the individual's conception of them than in the reality.

The views of the War Office Committee were that, while the commotional shell shock was due to explosion, the emotional type was brought about by a great variety of causes; the exciting factor being physical and mental exhaustion and some definite disturbance. The predisposing causes included inherent instability, previous illness or injury such as concussion, racial characteristics, education and social conditions.

The connexion of bad morale with the outbreak of emotional "shell shock" was stressed by many witnesses as a matter of experience and agreed on by the Committee.

It was again recently re-emphasized by Ross while Bennet pointed out that boredom in particular was responsible as a potent cause of low morale for the production of all types of neurotic symptoms.

The importance of physical factors (especially of hunger in the Spanish civil war) was again demonstrated by Mira.

The production of this failure of concentration does not seem to have been much discussed. Several points are significant. Firstly, as has been pointed out by Sargant and Slater, the proportion of cases showing previous psychological abnormality (which could be detected) was considerably smaller than the proportion of similar cases among the emotional "shell shock" mentioned in the War Office Inquiry; a point which is incidentally supported by the cases quoted here.

Secondly, a large proportion had been heavily dive-bombed. The comparison of the proportion of these with the last war's shell shock is of course difficult, since it was readily admitted that prolonged exposure to gunfire played a large, but not the greatest, part in the onset of emotional shell shock.

Thirdly, it must be remembered that commotional shock was marked in the last war to have been associated as might be expected with inability to concentrate.

Fourthly, as has been observed in the cases here under study, that the inability to concentrate was in no way associated with lowered morale. The cases quoted and their officers' reports illustrate this. The earlier history of these men, while in their acute phase, was not always available in great detail but, as far as it could be obtained, it suggested that this point could also be made at that stage.

It is then possible that one explanation may be found for all these points, namely that many cases are entirely or largely due to commotional shock; other physical factors were also perhaps of more than usual importance, though it was shown by Ross and by Hubert (1941) that those suffering principally from the effects of these recovered surprisingly quickly with adequate food and rest.

If the commotional type is more common it might well be expected that inability to concentrate would be a prominent feature. It may of course be overshadowed at the time by other symptoms but will reveal itself as they pass. This was particularly noticeable in those whose morale was considered high.

If this be so, it would be expected that cases should occur at random rather than, like "emotional shell shock," in epidemics from bad units. Insufficient evidence is available to say if this is so or why these men broke under bombing which was practically speaking the same for many of their comrades.

If anxiety is present as well, it may be supposed that this tends to perpetuate the failure of concentration for several reasons. Firstly, the occurrence of symptoms in any one is likely to produce anxiety over his health; and Ross even stated that all his patients with insomnia and failure of concentration developed a fear of insanity; thus a vicious circle of anxiety and further inability to concentrate are set up. Even if this is not so it is probable

that the patient's fear of losing his job or his rank, his prestige or his pay, will set up a similar anxiety and so increase his inefficiency.

Secondly, anxiety may produce failure of concentration by merely excluding from attention topics other than the cause of the anxiety.

Thirdly, there were cases in whom it was observed that morale was low and who showed evidence of a good previous personality. In these it appeared possible that various symptoms, including failure of concentration, developed under exposure. Many remain later as hysterical symptoms, like aphonia or stammering, with the object of preventing the return of their owners to the Army or to any future exposure. It was noted that in some cases other hysterical symptoms were associated.

The production of insidious cases is perhaps due to a gradual increase in the patient's consideration and imagination of past and future exposure, so that the stress gradually mounts.

As was noted a high proportion of the few cases seen were officers who were also intelligent and imaginative.

TREATMENT.

As has been mentioned, the need for rapid removal of anxiety as soon as possible by adequate explanation and reassurance has been generally emphasized. In particular the need for discussion of the symptoms was stressed by Rivers (1917) who condemned the advice so often given to the patient to forget his symptoms as a frank impossibility and substituted the suggestion that they should instead be viewed in as matter-of-fact a light as possible.

Such treatment in the early stages will undoubtedly go far to diminish anxiety and so the failure of concentration ; but in some cases it would seem that a moderately long period is bound to elapse before concentration will be at its original capacity.

It thus becomes extremely important for the physician to decide the extent and the cause of the symptoms. The quick return to duty advocated, partly for disciplinary reasons and partly for the patient's sake, must be supposed either not to have dealt with cases who had little lack of concentration nor with situations where much concentration was required.

It is felt however that many cases do exist where a rapid return to duty will produce harm rather than good both to the patient himself, because he realizes his own inefficiency, and to his comrades, perhaps paradoxically enough, because they do not do so. Such a contention is supported by the cases seen relapsing soon after their return to duty.

It will thus be very important to diagnose between the causes of the failure of concentration and to differentiate the type where rest is required ; it is suggested that this may be done by an assessment of the previous personality and an investigation as to the morale, the presence or absence of hysterical symptoms and the amount of failure of concentration. Cases regarded as hysterical may be returned as soon as possible, provided they are not in positions of dangerous responsibility, but it is highly important that the others should be recognized as unfit, temporarily, for prolonged or complicated brain work. Unfortunately the organization of the Army still finds the employment of partially fit men difficult, particularly if their symptoms are of a psychological nature, and the gradual increase of the work for such men needs elastic arrangement, but it should be possible with sufficient supervision from unit M.O.s and adequate co-operation from the patient's superiors. It is as fatal surely to his self-respect and self-confidence that he should do too little as too much.

In view of the patient's susceptibility to air raids, it has been suggested that efforts should be made to "decondition" him ; but so far the only deconditioning process used would seem to be the employment of time although on some scale E.M.S. Centres have attempted the use of artificial noise to the patient's reactions. In this connexion too the course in use at Battle Schools to accustom men to fearsome sounds and thoughts may be regarded as prophylaxis.

Another kind of prophylaxis has been suggested by Bion (1940) who stressed the import-

ance of impressing on the soldier and civilian, in training, the exact details of the job to be done as soon as they become exposed to hostile action.

The relief resulting from actual manipulative work was stressed by Rivers especially in evidence to the War Office Inquiry.

SUMMARY.

(1) Attention is drawn to the importance of the symptom of failure of concentration in acute war neurosis.

(2) Cases showing this symptom do so either as residual from a typical syndrome or as part of an insidious subacute war neurosis. Either may develop depressive features.

(3) The production of this symptom is discussed and it is held that an assessment must be made of its importance in each case so that men unable to concentrate are not returned to exacting duty. This assessment must be made by an investigation of the previous personality and the amount of concentration power lost, the morale and the presence of hysterical symptoms.

REFERENCES.

- BENNET, E. A. (1941). *Med. Press and Circular*, February 12, p. 128.
 BENTON, G. H. (1921). *Journ. Amer. Med. Assoc.*, **77**, 360.
 BION, W. R. (1940). "The Neurosis in War," edited by E. Miller, p. 180.
 BLAKESLEE, G. A. (1941). *N.Y. State, Journ. of Medicine*, **1**, 1241.
 HUBERT, W. H. de B. (1941). *Lancet*, **1**, 306.
 MIRA, E. (1939). *Brit. Med. Journ.*, **1**, 1217.
 MONS, W. E. R. (1941). *Ibid.*, **2**, 625.
 RIVERS (1917). *Lancet*, **1**, 912.
 ROSS, T. A. (1941). "Med. Diseases of War." Edited by Sir A. Hurst, Second Edition, p. 143.
 SARGANT, W., and SLATER, E. (1940). *Lancet*, **2**, 1.
 SMITH, R. P. (1916). *Proc. Roy. Soc. Med.*, **10**, Sect. Psych., 1.
 W.O. COMMITTEE OF ENQUIRY INTO SHELL SHOCK (1922) *passim*.

Editorial.

ALCOHOLIZED T.A.B. VACCINE.

THE Army is now using a new typhoid vaccine. This is not the first time a major change has been made in the preparation.

When Wright first introduced typhoid inoculation in 1896 the vaccine consisted of a simple killed-broth-culture of typhoid bacilli. It must have been effective, for his Jenner-like experiment in India was successful and convinced the medical world of the value of prophylactic inoculation against typhoid.

But the vaccine, as it was developed by Wright and Leishman, did not come into its own immediately. It was used in the South African War but the employment in that campaign was limited and the success not sufficiently striking to encourage its wider application. The severe local and general reactions produced by the vaccine may have been responsible for there is little doubt that many of them were serious.

It is especially interesting in the light of present-day knowledge to recall that when the questions of modifying the method of preparation and selecting a new strain of organism arose the virulence of the various cultures available was discussed. But virulence apparently took second place to the immunity reactions then accepted as the most important—agglutination and phagocytosis. Leishman selected the culture isolated from the spleen of Gunner Rawlings because of the satisfactory immunity reactions he was able to demonstrate with this strain. He fully realized that the Rawlings strain had a lower virulence than other strains available.

After further experimentation, inoculation against typhoid was reintroduced into India in 1906. The preparation was still a broth culture, but it was a standardized heat-killed, Lysol-preserved vaccine whose worth was gradually recognized as a result of the large scale field trials undertaken.

The Army had such confidence in the typhoid vaccine that, at the outbreak of hostilities in 1914, inoculation of the whole Army was at once put into effect. The paratyphoid organisms A and B were added in 1915 and certain modifications were introduced into the method of preparation but the original strains of bacteria were retained and the essential procedures remained unchanged.

Although valid statistical evidence was wanting the value of the Army T.A.B. vaccine during the war 1914–18 has never been challenged. The preparation had been standardized and for some years the manufacture was almost routine with little call for experimental work.

About 1928 certain facts stimulated fresh investigation. The long continued and frequent sub-cultures of the Rawlings strain had resulted in the development of a dominant roughness which could only be overcome by the most meticulous colony selection. The growing appreciation of the essential difference between somatic and flagellar antigens led to a more detailed examination of the agglutinin responses. The method of preparation of the vaccine had enhanced the flagellar antigens to the extent that the somatic antigens were almost lost in the S—R variation, so much so that a thesis was put forward to try and prove that inoculation agglutinins could be differentiated from infection agglutinins by the fact that the former were pure H agglutinins and the latter were OH. This was of course subsequently shown to be incorrect.

Much investigational work was undertaken during this period but little was published because no real solutions to the problems were forthcoming. The question of changing the strains of organisms was considered but in the absence of a suitable laboratory animal for testing the strains no action was taken. At the same time there was no real evidence to show that the vaccine had lost its effectiveness.

In 1932, however, Grinnell demonstrated the suitability of white mice in typhoid experimental work. The possibilities were immediately appreciated by the R.A.M. College workers, Perry, Findlay and Bensted, and also by Felix and his co-workers. As a result of the intensive investigations which followed it was established that the immunizing power of the typhoid vaccine was associated with the virulence of the organism employed, that the virulence was related to a third antigen, (Vi), and that mouse protection tests, active and passive, offered reliable methods of assessing the immunizing power of a vaccine.

Further experiment showed that with the new methods available virulent variants could be obtained by selective animal passage from relatively avirulent cultures. The Rawlings strain was now almost avirulent but the sentiment attached to an old and tried friend was such that when a variant of the highest virulence, rich in Vi-antigen, was obtained by the new technique it was selected for the typhoid element of the improved vaccine which developed from this work.

The new vaccine, as judged by mouse protection tests, was almost ten times more effective than the old vaccine and it was taken into general use by the Army towards the end of 1933. The steady fall in the incidence of typhoid in India from that date has been recorded by Bensted, and more recently Boyd has demonstrated the efficiency of the vaccine in the Middle East during the war period. The story of the superiority of the British Army vaccine over that employed by the Italians has already received wide publicity.

But the Army was not content even with this vaccine. The Vi-antigen was not a stable antigen; it was adversely affected by the phenol used as a preservative in the standard vaccine. Army workers and others had shown that the Vi-antigen was unchanged in the presence of other substances, including alcohol, and when in 1941 Felix introduced the alcohol-killed and alcohol-preserved vaccine it was clear that it deserved the fullest consideration.

The claims for the alcoholized vaccine were that it was a safe product, that the local reactions following the injections were no greater than with the heat-killed phenol-preserved vaccines, that the general reactions were less and that the Vi-antibody response was much greater. The mouse protection tests, both active and passive, suggested a more efficient vaccine.

Although the strains of organisms selected and the preliminary preparation of the vaccine were the same, the treatment of the bacterial suspensions was so fundamentally different that the new method could not be accepted without question. Preliminary experiments, however, fully confirmed the claims of Felix and more complete investigations were advised. A long series of laboratory and field trials provided additional evidence of the value of alcoholized vaccine. Mouse protection tests on a large scale, and repeated many times, demonstrated its superiority over the standard preparation. Since it was these particular tests which influenced the Army in introducing changes in 1933, the results with the alcoholized vaccine carried considerable weight when the more critical decision had to be made. Reduction of general reactions and the enhanced keeping properties of the vaccine added further weight to the argument. Field trials on a wider scale then followed but it was not until August, 1943, after full discussion of the results obtained, that the final decision was taken. Two and a half years may seem a long time to decide a change so patently indicated by previous work but the truth was that the Army knew the high value of their standard vaccine and were loath to make a change without the fullest evidence of the value of the new product. Routine issues began some months ago but until the alcoholized vaccine has been in general use for some time to come it is obvious that its final assessment will not be possible. There is every confidence, however, that it will prove superior to previous preparations.

Clinical and Other Notes.

A CASE PRESENTING AN ABNORMAL PERITONEAL LAYER COVERING THE SMALL BOWEL.

BY MAJOR E. B. TREHAIR,
South African Medical Corps.

THE following case is reported because of the unusual and unaccounted-for anomaly at operation :

The patient, a soldier aged 46, was admitted to hospital on November 14, 1942, with acute abdominal pain. He stated he first experienced severe generalized abdominal pain in the early hours of the previous day. The pain eased later in the morning but he reported to his R.M.O. who gave him medicine which was followed by vomiting. This was the only occasion on which he vomited. The pain became worse in the afternoon and shifted to the right iliac fossa. He was given an enema "with a good constipated result" but with no relief of the pain. It was at this stage he was sent into this hospital. The patient had always been a healthy man until two years ago. He then developed difficulty in getting his bowels to act and it was his custom to take a purgative every third or fourth day.

On admission his temperature was 99.4° F.; pulse 96; leucocyte count 11,200. He presented extreme tenderness over McBurney's point with right rectus rigidity. Per rectum nothing abnormal was noted. A diagnosis of acute appendicitis was made.

Under a general anæsthetic the abdomen was opened through a right grid-iron incision. Free fluid, straw-coloured, was present in the peritoneal cavity but the appendix appeared normal. The cæcum was congested and cedematous. An attempt to deliver a loop of small intestine was found to be fruitless; instead, a doughy mass could be felt towards the left. The appendix was removed, the grid-iron incision closed and a paramedian incision made. The whole of the jejunum and ileum were found to be lying behind a layer of peritoneum. This layer was incised in its whole extent longitudinally and the small bowel set free. The terminal ileum one inch from its ileo-cæcal valve passed under a narrow arch formed by this abnormal layer. The pillars of the arch were divided and the ileum freed; at the same time the normal colour of the cæcum was restored. Apparently the arch was interfering with the blood supply of the cæcum.

The abnormal layer of peritoneum was, in appearance and thickness, exactly similar to the rest of the peritoneum. The layer extended from the root of the meso-colon above to the brim of the pelvis below and from the inner aspects of the ascending colon across to the inner aspect of the descending colon at the junction of the visceral with the parietal peritoneum. The large bowel was normal in appearance and situation. The freed small bowel and mesentery were normal in appearance.

X-ray of the bowel taken after the operation showed both jejunum and ileum in normal position and no delay in the passage of the meal.

The patient was relieved of his pain and his bowels again acted regularly following the operation.

The interesting features of this case are :—

(1) The presence of an abnormal layer of peritoneum binding the small bowel down to the posterior wall.

(2) The late onset of any symptoms of interference with bowel function.

I find it difficult to account for this abnormal layer. Lee McGregor does not mention it in his list of anomalies. The layer must have been formed about the time the small bowel returned to the abdominal cavity. Norman Dott describes this stage as follows :—

"In the second stage of rotation at the tenth week, the mid-gut loop is returned to the abdominal cavity. As the small intestine enters the abdomen, the hind-gut and its mesentery which occupy the mid-line are pushed before them folded to the left and backwards."

Did the small bowel gain a covering from the mesentery of the hind-gut during this second stage? Is it a remnant of the vitelline sac? Opinions on these points would be welcome.

I should like to express my thanks to Brigadier Orenstein, D.M.S., U.D.F., for permission to forward this paper to the R.A.M.C. Journal.

REFERENCES.

- MCGREGOR, LFE. "Synopsis of Surgical Anatomy."
Idem. "Anomalies of Intestinal Rotation."
 DOTT, N. (1923). *Brit. Journ. Surg.*

CASE REPORT OF PSYCHOSIS FOLLOWING HEAT STROKE.

BY MAJOR H. A. PALMER,
Royal Army Medical Corps.

THE following case seems sufficiently clear as regards the ætiological relationship between an attack of heat stroke and ensuing psychosis to merit publication.

The patient, M. M., aged 20, has a family history free from neuropathic features and prior to the present illness, appears to have been free himself from nervous complaint.

On 18.7.42 he was admitted to a military hospital suffering from heat stroke. He complained that day of giddiness and malaise, commenced to twitch and vomit and, soon after admission to hospital, he had convulsions and became unconscious.

His temperature on admission was 109° F. in the axilla. He was immediately placed on emergency treatment for hyperpyrexia with ice water. A blood smear was found to be negative for malarial parasites. A blood urea estimation gave a result of 60 mg. per cent.

Treatment was continued with ice water sponging and ice water enemata and he was given intravenous quinine, and morphia and hyoscine hypodermically.

On 20.7.42 his morning temperature was 102.6° F., he was only slightly confused and stated that he felt better. The same day he gradually became more confused and was inclined to violence and, at 5 p.m., his temperature rose to 106° F. and he again became unconscious and had to be treated in the heat stroke centre.

On 21.7.42 the morning temperature was 109° F., he appeared more rational but was slightly jaundiced.

On 22.7.42 the morning temperature was normal, he was still rather confused, blood urea 45 mg. per cent, Van den Bergh negative, direct and indirect. His general condition was worse in the evening and he was deluded, confused and incontinent.

Between 22.7.42 and 25.7.42 his temperature gradually subsided but his mental condition steadily deteriorated and, being extremely confused and disorientated, he was transferred to the neuropsychiatric centre.

On arrival at the neuropsychiatric centre his mental state was characterized by confusion and disorientation and he was apparently experiencing visual and auditory hallucinations. He was, however, able to give a general account of the details surrounding his illness.

His physical state was poor, his temperature was 100° F. in the axilla. Urine normal.

On 26.7.42 his temperature was 101° F., muscular twitches had re-asserted themselves and he was considered to be dangerously ill. A blood smear was again negative for malarial parasites.

On 27.7.42 his temperature was 103° F., and during 25-26-27.7.42 he continued to require ice water treatment. He was again given intravenous quinine followed by quinine by mouth as a routine.

On 29.7.42 his condition appeared to be improving but he was still pyrexial with muscle twitches and albumin was present in the urine.

On 1.8.42 his condition had commenced to deteriorate once more, his pulse was irregular and of poor volume and his temperature was 104° F. His mental state was characterized by terrifying visual and auditory hallucinations.

He continued to receive tepid sponging with occasional ice water treatment and his temperature now began to settle so that by 6.8.42 it had subsided to normal and remained normal thereafter. His physical condition commenced steadily to improve from 6.8.42, and thereafter never gave any further cause for anxiety.

His mental state continued to show marked abnormality and on 6.8.42 showed restlessness, agitation and confusion. His habits were filthy and degraded. He expressed nihilistic delusions such as that he was dead and rotting away. He commenced however to show periods of relative lucidity lasting two to three hours during which he was able to give a reasonable account of himself.

On 28.8.42 he was transferred to a military neuropathic hospital. He was ambulant and, on a routine examination of the various bodily systems, showed no abnormality save a rather rapid pulse. The urine was normal.

Psychiatric Examination.—He was restless in a general sort of way but was amenable to nursing supervision. He gave a sketchy but correct account of his illness. He was disciplined and obeyed simple commands and knew that he was a sick soldier. He was unable to sustain a conversation but sustained a questionnaire. In spite of these facts he was disorientated for time and place.

He appeared dazed, puzzled, bewildered and worried about his condition. The setting of his worry was reminiscent of one who felt unworthy to live. He was not hallucinated nor could the term delusion be applied to any of the ideas he expressed. There were no ideas of reference. He was neither elated nor depressed and his mood was best described as one of bewildered anxiety.

His spontaneous speech was somewhat staccato, fragmentary and occasionally fatuous and the superficial appearance of clowning resembled a type of stage lunatic. He expressed suicidal ideas and occasionally seemed a trifle bizarre and manneristic, as for instance when he stood at attention for an hour. He was distractable but if left to himself would pursue a train of thought with appropriate remarks at random.

The following is an example of his spontaneous talk on 13.8.42, the medical officer sitting writing in the room as if not taking any notice of him.

"How far am I away from England, Sir?" paused for two minutes. "Can I have a book on history?"—he gets up from his chair and picks up a book on history belonging to a nurse. Another pause—"When will I be fit to travel?" another pause, "I think I had better leave the room, Sir." On attempting to converse with him he yielded the following:—

M.O.: "How are you?"

Reply: "I think I've rather spoiled the food, Sir."

M.O.: "How?"

Reply: "I haven't had an action since yesterday."

M.O.: "Where are you?"

Reply: "Sitting in this chair, Sir—a long way from England."

M.O.: "Yes, but where?"

Reply: "I am not clear about that—I've got to make up for my misdeed—I've spoilt the food—tripping up on the floor."

M.O.: "Are you ill?"

Reply: "Yes Sir."

M.O.: "What is wrong with you?"

Reply: "I'd like to have a medical inspection—would you test me, Sir? I think I've damaged the food—I've spoilt it for the others—it's difficult to explain—I suppose it's this broken back—curious it feels bad."

M.O.: "What month is it?"

Reply: "Couldn't tell you, Sir—Summer."

M.O.: "Where are you now?"

Reply: "I've no idea—far away—I wish I was in England—a broken head—poor state of health."

M.O.: "Is there a war on?"

Reply: "Yes Sir—Churchill said it would be over in three years—I seem to have bad dreams at night—I never get to sleep—I wish I could be on the high seas—roving instinct—I'd like to travel."

M.O. : " Where to ? "

Reply : " All over the world."

A test of his intellectual functions showed the following sample of results : $13 \times 13 = 169$. Five largest towns given correctly. A short story (cowboy) was read to him. He could not repeat a word of it. When asked what the story was about he said, " To get back to England and normal civilized life."

The pervading clinical impression was schizophrenic in type. He expressed several ideas of unworthiness, however, and showed a patchy lowering of consciousness. Some of his intellectual functions were clearly intact. His memory for recent events was in some respects poor and in other respects good.

The following is a controlled questionnaire :—

Q.1.—" You told one of the nurses that you were half woman and half man. What do you mean by that ? "

A.—" I am not in my right senses, Doctor."

Q.2.—" What makes you say that ? "

A.—" I've led a strange life."

Q.3.—" Do you mean in hospital ? "

A.—" Yes Sir."

Q.4.—" What did you do that was strange ? "

A.—" I don't recollect, Sir ; I need to concentrate more."

Q.5.—" Can't you concentrate ? "

A.—" No—not easily."

Q.6.—" Have you had an illness ? "

A.—" Heat stroke."

Q.7.—" Where did you have that ? "

A.—" In ————" (correct).

The above questionnaire was then repeated in a less controlled fashioned six hours later, with the following results. The questions are represented by the numbers :—

(1) " I feel perfectly fit to go out. I felt dazed at the time."

(2) " I didn't understand what was happening."

(3) " I wanted to do Orderly's duties as well as anyone else."

(4) " I have done some harm. I feel ringing in my ears, Sir, I know the ship (gave its name correctly) reached its destination all right. It's a strange world. I've been crucified."

(5) " It's connected with the sanitation of hygiene. My nerves were not very hygienic. I feel all right now though."

(6) " Yes, I've had an illness. I've been dazed. I was very wicked. A bad drainage system."

From 3.9.42 to 24.11.42 his condition remained stationary as regards the physical state. Mentally he became more and more the picture of a deteriorating schizophrenic and on 24.11.42 he was evacuated to another hospital pending hospital ship accommodation for U.K. On 24.11.42 he was dull and detached, showed marked fragmentation of speech, thought blocking and clouding of consciousness. His behaviour was bizarre but no definite delusional material could be elicited. He was silly and fatuous and inclined to repeat stereotyped questions. He exhibited no spontaneous conversation. His habits had deteriorated and he required general supervision to keep himself clean. On one occasion, which was not witnessed by the M.O., he injured his forehead by falling but no conclusive interpretation could be formulated respecting the nature of this incident.

SUMMARY.

A psychosis following severe heat stroke is recorded. It resembled in general a post-traumatic psychosis but was not quite so faithfully schizophrenic in type and was entirely lacking in paranoid features. Paradoxical patchiness was the dominant impression. Thus he remembered the broad outlines of his illness and clearly knew he was in the M.E., and yet at another moment said that he was in England. Although showing delirious features during the acute febrile stage of terrifying visual and auditory hallucinations, there was

subsequently no evidence whatsoever of content disorder apart from the ideas of guilt with regard to the degraded habits of his acute stage.

I wish to acknowledge the co-operation of Major J. H. Groom, R.A.M.C., and Major Sutton, R.A.M.C., in the collection of the clinical data of this case and under whom all the treatment of the case was carried out. The case was seen by Brigadier G. W. B. James and Brigadier McAlpine. I wish to thank Colonel W. H. Kerr, T.D., for permission to forward the notes of this case for publication.

M.E.S.H. BATH SET.

BY MAJOR N. BASTER,

Royal Army Medical Corps.

INTENTION.

To produce an easily and quickly made bath set using as its basis the M.E.S.H. two-gallon improvised shower, described in this number of the *Journal* (Hutchinson, G. R.).

SPECIFICATION.

- 1) Time for erection, two men—3 minutes.
- 2) Time taken for initial production of hot water—12 to 13 minutes.
- 3) Subsequent production—1 gallon of boiling water per minute.
- 4) Water consumption—1½ gallons per man.
- 5) Fuel consumption—¾ gallon of petrol per hour, hydra full on.
- 6) Fuel consumption—½ to ¾ gallon of petrol per hour, hydra turned down and using six sprays only.
- 7) Portability—can easily be carried by two men in four lifts.
- 8) Transportability—4 sets can be carried by one 15-cwt. truck, 14 to 16 sets in one 3-ton truck.

Time per man for bathing—minimum 4 minutes; 5 minutes is the natural average and, allowing each man 5 minutes, 72 men can be bathed in one hour.

The boiler gives adequate water for six sprays each three minutes, enabling 120 men to be bathed in one hour if speed is essential. If six minutes per man is allowed a drum disinfectant can be worked from one half of the boiler unit allowing disinfestation to be carried out simultaneously with bathing.

Components and Weights (fig. 1).

(1) Hydra burner	.. .. .	64½ lb.
(2) Boiler unit	.. .. .	104 lb.
(3) Frame	.. .. .	137 lb.
(4) Water containers, spray units (M.E.S.H. 2-gallon improvised showers) and measure	.. .. .	53 lb.
Total weight of complete set		358½ lb.

Used as a wood burning wall set (2 and 4 as above and 12 small blocks of wood) 160 lb.

Materials used in construction (all easily obtainable in M.E.)

Angle iron	76 ft.
Reinforcing iron	27 ft. 6 in.
" T " iron 1 in.	2 ft.
Strip iron 1 in.	2 ft. 6 in.
Strip iron $\frac{5}{8}$ in.	5 ft. 10 in.
Sheet iron 18 gauge	2 sq. ft.
Sheet iron 16 gauge	7 ft. $4\frac{1}{2}$ in. by 1 ft. $7\frac{1}{2}$ in.
Oil drums 5-gallon	2
Steel tube $1\frac{1}{4}$ in.	1 ft. 10 in.
Elbows $1\frac{1}{4}$ in.	2
Sockets $1\frac{1}{4}$ in.	2
Nipples $1\frac{1}{4}$ in.	2
44-gallon drum (water container)	1
M.E.S.H. 2-gallon showers	6

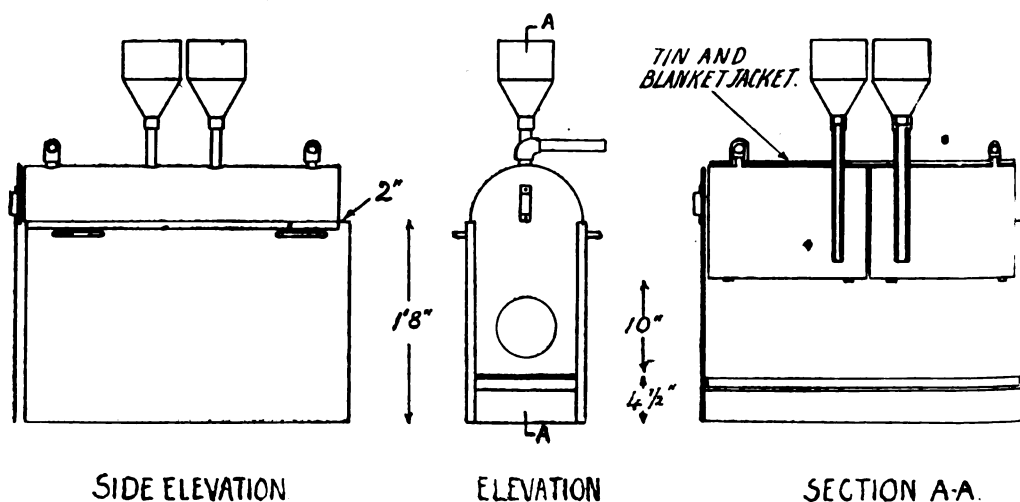


FIG. 1.

DESCRIPTION OF SET.

Boiler Unit (fig. 1).—Constructed from two 5-gallon oil drums, spot-welded together end to end. Filler and delivery pipes are welded into the drums, filler funnels and extensions to the delivery pipes screw into position. The boiler is set up on a fire box made of sheet iron on a frame of angle iron picket; firebars (also angle iron picket) are arranged at the bottom of the firebox; semi-circular iron strips support the boiler in the firebox. A cover of thin sheet metal covered with blanket is placed on the upper surface of the boiler to provide a jacket. A baffle slides down in front of the firebox for use with a hydra burner. It is removed if any other method of heating is used. For transport, the filler funnels and delivery pipe extensions screw off; the jacket is removed and they all fit inside the firebox. The boilers are turned upside down so that the pipe fittings face into the firebox and are protected. All joints are welded.

Shower Units.—M.E.S.H. portable 2-gallon showers, fitted into two-thirds of a 44-gallon drum for transport.

Burner.—Petrol cooker No. 1 advised, though any other method of heating can be used. Firebox is arranged so that petrol cooker No. 1 can be used as standard. If not available, front shield can be removed and wood, charcoal or scrub can be used.

Frame (fig. 2).—Frame is made up of angle iron picket, welded together to provide requisite lengths. It consists of a top member supported by three legs at either end, which are tapered to fit into sockets in the top member (see "A," fig. 2). Three holders ("B" fig. 2)

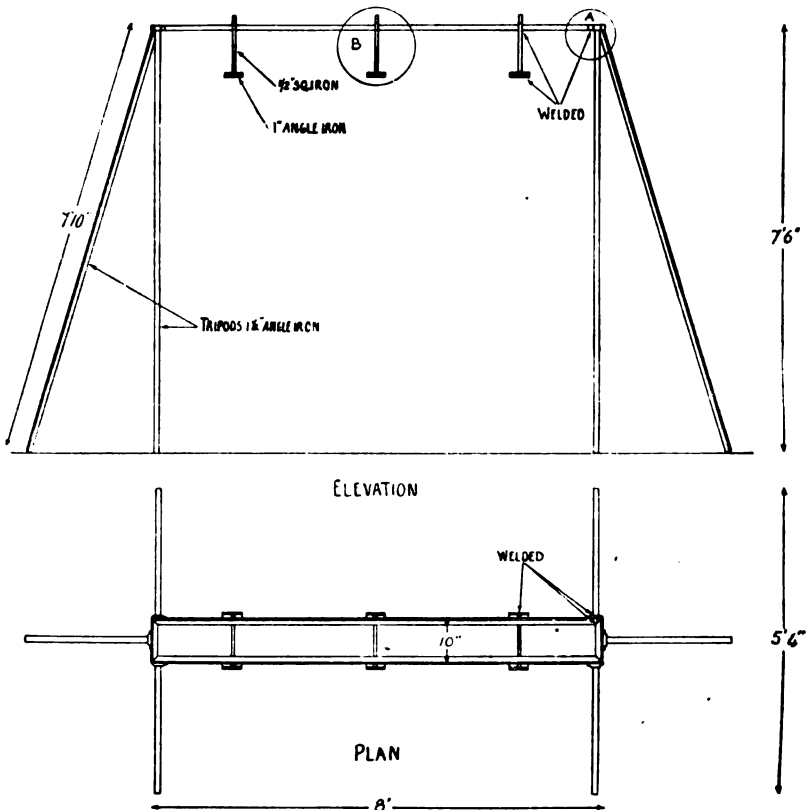


FIG. 2.

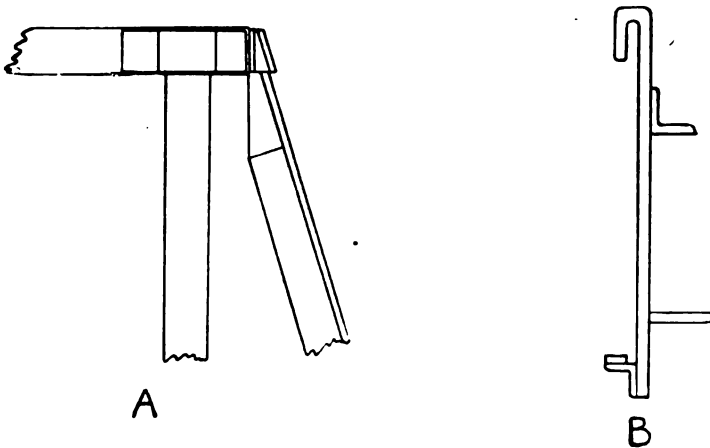


FIG. 3.

for spray units are welded on to each side of the top members. They consist of a vertical hook, made of reinforcing bar, and at the bottom have a small platform made of angle iron picket with a small strip welded on to it to prevent forward movement of the spray unit

when in position. Each pair is joined with a short length of reinforcing bar welded to the bottom ends. This improves rigidity and makes the top member a cradle for the legs during transport. All joints are welded. Enlargements of "A" and "B" appear in fig. 3. For transport the frame is completely collapsible.

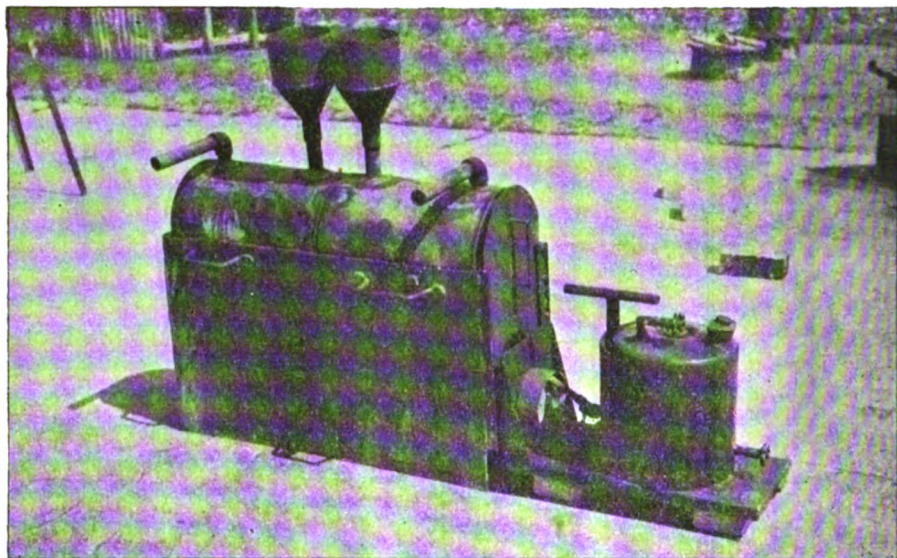


FIG. 4.

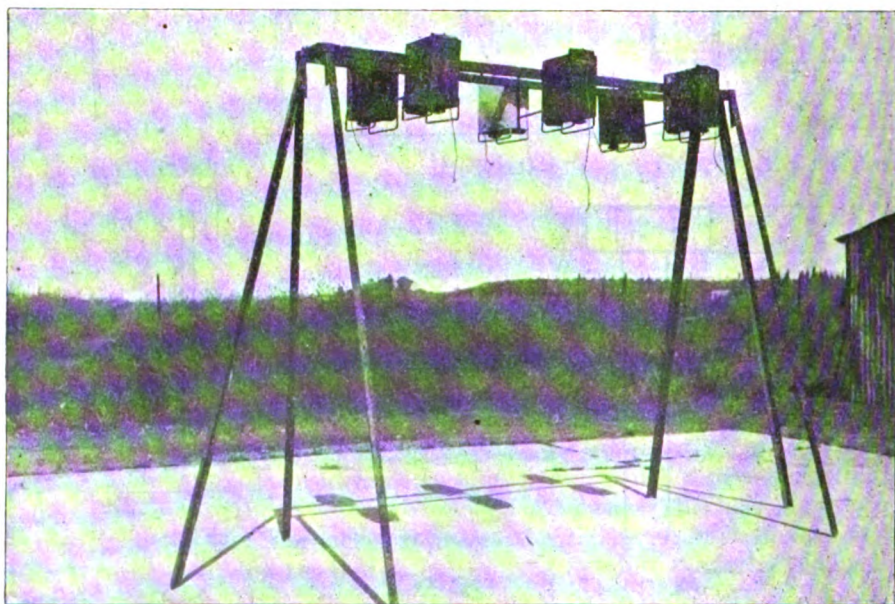


FIG. 5.

METHOD OF USE.

Erection.—The boiler is placed in position, about ten yards from where the sprays will be located.

The boilers are set right way up on the firebox with the delivery pipes screwed in and the jacket put over the boiler, leaving a 2 inch gap at far end of the firebox from the burner, which serves as a chimney. The boilers are filled with water (fig. 4).

The frame is then erected by raising one end of the top member, slipping into position two

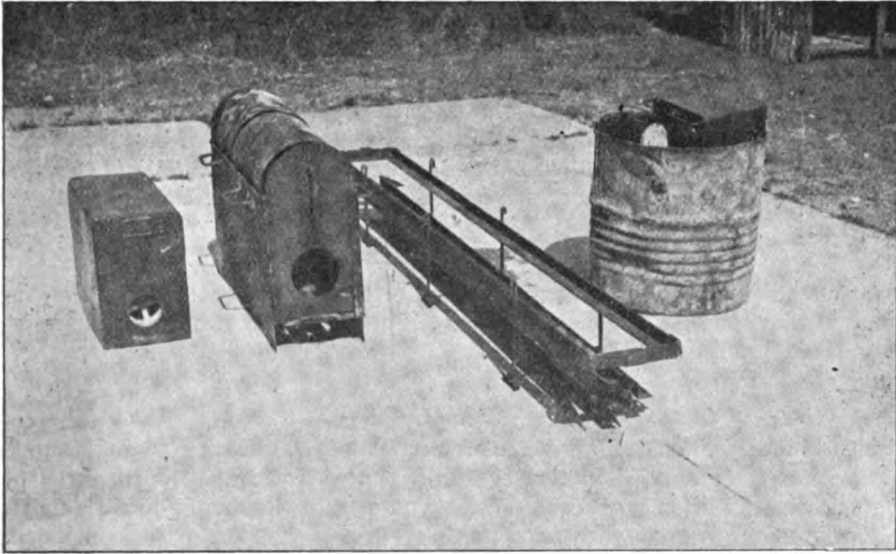


FIG. 6.

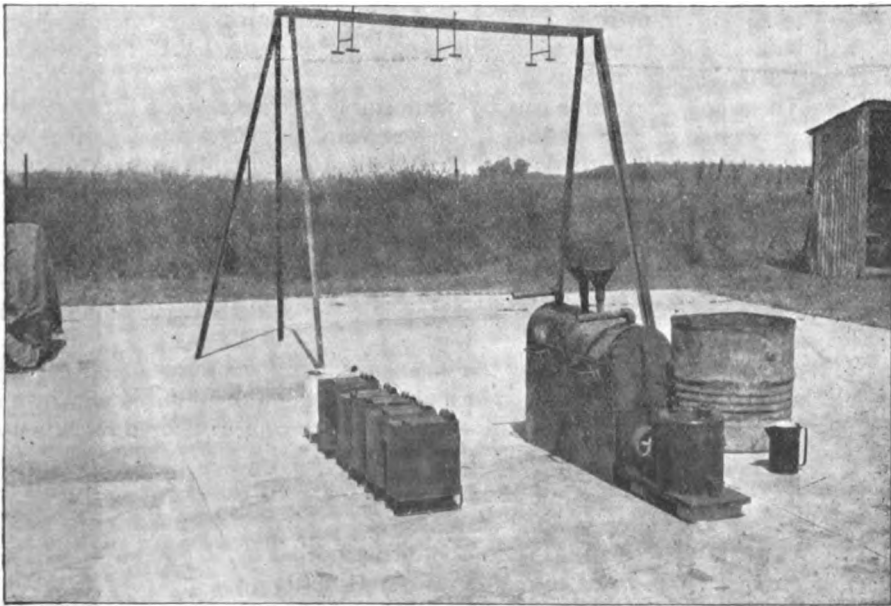


FIG. 7.

legs, raising the other end of the top member and slipping into position two other legs. The frame is now rendered rigid by putting into position the two bracing legs. The frame is now ready for use. (Fig. 5 shows frame erected with sprays in position.)

The sprays are taken from their container and set out in a row on the left hand side of the boiler ; the container, which becomes the water reservoir, is placed on the right (fig. 6).

The Burner is placed in position and lit.

The unit is now ready for use (fig. 7).

OPERATION.

The operator stands on the right of the boiler, bathers pick up showers, pass to left of boiler, hold shower under delivery pipe from which they receive half a gallon of boiling water, displaced by a half gallon of cold water, put in with the measure from the water reservoir. The bathers then top up their showers with cold water from the water source, stand pipe, tap, water cart or whatever source is used and proceed to the shower stand, when they fix up their showers and bathe. They return past the boiler and deposit their empty showers ; dry and dress.

PERSONNEL FOR OBSERVATION.

The whole set is operated by one man who can be trained to use the set in a few minutes. It is suggested that the first two men bathed be kept to instruct future bathers in filling up the sprays and to " police " the bathing.

POINTS OF INTEREST.

The outfit is made from readily available materials of the cheapest character and almost no tubing is used. No pump is necessary to lift the water to give the required head for showering as each man lifts his own shower. No nuts and bolts are used in the construction and erection ; welding is used when fixed joints are necessary ; the major components then fit together. Repairs can be easily carried out by any Army fitter in the case of major damage. Any minor damage can be repaired by the operator. The apparatus is of robust construction and sets made now should see the war out successfully.

Erection.—The shower framework takes less than two minutes to erect. It dismantles into very small bulk and can be erected inside a building or in an I.P.P. tent, which latter makes a very good bathhouse.

Portability.—The whole apparatus can be comfortably carried in four lifts by two men. This gives it the very great advantage that it can be erected in places not accessible to motor transport. It often happens that the last hundred yards to a suitable bathing place cannot be traversed by lorry. It is readily adaptable to mule transport.

One 3-ton truck will carry 14 to 16 sets.

One 15-cwt. truck will carry 4 sets.

Extension.—Further sets of six sprays can be added by the addition of a further top member and two legs per six sprays. In anything but the coldest weather one boiler unit will supply two sets of six sprays.

Use as a " Wall Set."—Instead of using the independent support frame a wall can be used for supporting the sprays which are screwed or nailed on to the wall and used as shown in the previous article. This will be of great value when a stone or cement floored room is used for bathing.

CONCLUSION.

- (1) The apparatus gives a simply-made bath set.
- (2) It can be carried in two man lifts and easily transported by M.T.
- (3) It is easily and quickly made of readily available materials.
- (4) It is simply and quickly erected and got into operation.
- (5) It is operated by one man who requires no special training.
- (6) In an emergency it would be possible to arrange for large numbers of these bath sets to be manufactured locally in the Middle East.
- (7) Finally, it is a matter for discussion whether a bath unit constructed on the lines described, because of its greater adaptability, simplicity of operation and economy in per-

sonnel, requiring only one man to work each set, and its ease of transport, is not better fitted for field work than the present Army bath set.

My thanks are due to No. 52 Mobile Bath Unit who carried out the practical trials, to the Commandant, M. E. School of Hygiene, and D.M.S., G.H.Q., M.E.F., for permission to make this communication.

A PORTABLE IMPROVISED SHOWER.

BY STAFF SERJEANT G. R. HUTCHINSON,
Royal Army Medical Corps,
M.E. School of Hygiene.

(1) INTENTION.

A GREAT need exists for some portable easily devised appliance to provide satisfactory bathing arrangements under field conditions. Bathing in cut-down 4 gallon petrol tins, which have been the standby in the Middle East, results in rather inefficient ablution and

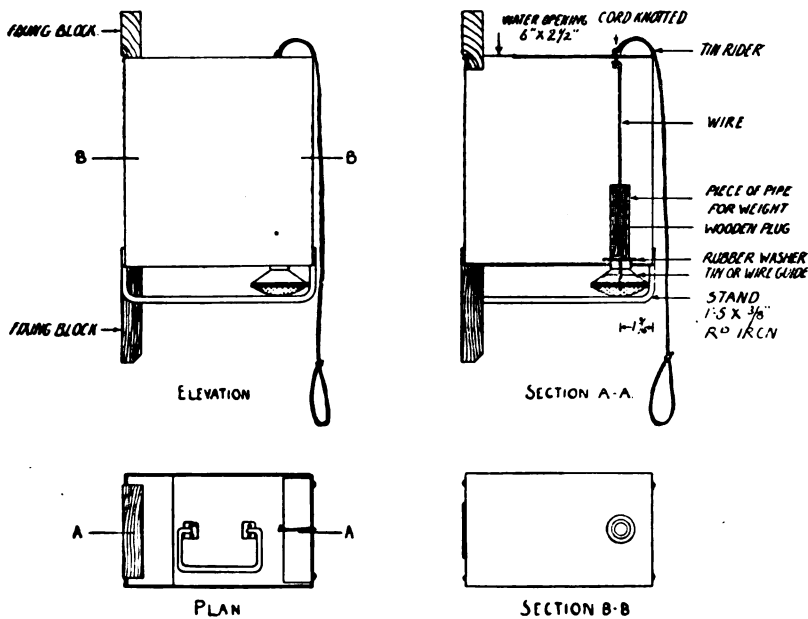


FIG. 1.

waste of the already precious small quantity of water which can be allotted for ablution out of a daily ration of say one to two gallons per day.

The sponging or splashing of water from a cut-down 4-gallon petrol tin on to the body often resulted in feet being washed before the rest of the body and so on. This misuse of precious water can be obviated by showering.

(2) EVOLUTION OF DESIGN.

It was decided early that water container and shower rose must be combined because of shortage of piping and tubing to improvise the more formal types of shower bath. The earlier models were constructed from 4-gallon non-returnable petrol tins for the water reser-

voir with a shower rose constructed from an empty beer can. The showers were easily damaged in transport, were heavy to lift into position when full of water and could not be rested on the ground once they had been filled with water because of the unguarded rose.

In the present design a 2-gallon petrol or water container is used as the shower reservoir and, the rose now being guarded, the appliance can be stood on the ground when the reservoir is full of water and, carrying only 2 gallons of water, can easily be lifted into position for showering by the user. The present pattern of improvised shower is illustrated in the drawing (fig. 1) and in figs. 2 and 3.

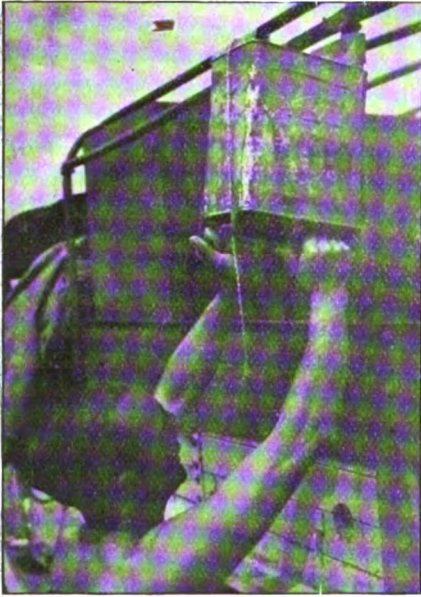


FIG. 2.



FIG. 3.

(3) PRACTICAL DETAILS OF CONSTRUCTION.

(a) *Materials required.*—

- 1 U.S. 2-gallon petrol or water container. These are often to be found in Salvage Depots minus the screw cap.
- 1 beer can.
- 1 piece of stout wire.
- 1 piece of piping.
- 1 piece of rubber inner tube.
- 1 piece of stout cord or flexible wire.
- 2 pieces 1 foot 5 inches by $\frac{3}{8}$ inch round iron.
- 2 fixing blocks of wood 5 inches by 3 inches by $1\frac{1}{4}$ inches.
- 4 screws, wood, 2 inches by 14.

(b) *Constructional Details.*—An opening 6 inches by $2\frac{1}{2}$ inches is cut in the top of the petrol tin for the water filling opening. This can be made to include the screwed pouring opening of the tin.

The cylindrical part of the beer can is removed, the base is perforated with about 100 holes. A wire stay to steady the valve assembly is soldered across the inside of the neck of the beer can and then the top and bottom are soldered together to form a rose.

A 1 inch diameter hole is cut in the bottom of the petrol tin and the neck of the beer can

soldered into the opening. A small hole is drilled in the top of the petrol tin directly above the neck of the beer can, that is, $1\frac{3}{4}$ inches from the edge of the petrol tin.

The semi-circular tin rider and the round iron stands are then soldered into position.

The piece of piping is then prepared to form the water valve. A wooden plug is driven into the pipe to within $\frac{1}{8}$ inch of the end. A loop is made in one end of the wire which is then driven right through the centre of the wooden plug to project $1\frac{1}{2}$ inches from the piece of piping. The rubber washer is then threaded on.

The cord is tied to the wire loop and a knot made to allow only $\frac{1}{2}$ inch of vertical movement when inside the shower tin. The valve assembly is then placed in position through the water filling opening; the cord threaded through the small hole and knotted again to prevent any side movement of the valve assembly.

(c) Weight empty : $3\frac{3}{4}$ pounds.

(d) Overall size : 1 foot 2 inches by 10 inches by 6 inches.

(e) Time for construction : two hours. This figure can easily be reduced when mass production is undertaken.

(4) METHOD OF USE.

(a) *Erection.*—By means of the quick-release double block fitting the shower can easily be brought into use in almost any situation and, if the blocks are permanently fixed to vehicle, wall or specially fitted shower stance, the shower can be brought into use with the minimum of delay. The following are some of the situations in which the shower might be erected and used : (i) On the inside of the canopy frame of a 3-ton truck allowing the truck body to be used as a closed-in shower compartment. (ii) Fitted externally on the canopy frame, the shower to be used outside, the user standing under the shower beside the truck. (iii) On the wall of a building. (iv) On a wooden gantry fixed 8 feet 6 inches above ground or duck-board level allowing a battery of showers to be in operation at one time. Such a frame, erected inside an I.P.P. tent with a duck-board flooring, would make a simple improvised shower unit.

(b) *Action by the bather.*—The bather takes an empty shower bath and fills it with up to 2 gallons of water. For hot showering, $\frac{1}{2}$ gallon of hot water obtained from a Soyer's stove, camp kettle or other improvised water heater, mixed with $1\frac{1}{2}$ gallons of cold water, makes a good hot shower mixture. As an empty stance becomes available the user lifts his shower into position in the holding blocks where it is held firmly and safely. The shower release cord is pulled down and the body wetted. Soaping is then carried out and the final wash-off given. Two gallons of water will provide one minute of shower time. On completion of the operation the user lifts down the empty shower, surrenders his stance to the next man and returns his shower can to the dump next the source of water.

(5) CONCLUSION.

This improvised shower provides the best answer yet given to the problem of ablution of troops in the field especially in conditions of dispersed or desert warfare where the ration of washing water is minimal. Any unit could make and carry about its own showering equipment and make small bodies of troops independent of the service of a Mobile Bath Unit. The appliance could also be used to supplement the bathing facilities of Mobile Bath Units and especially to deal with small isolated detachments.

A suggested scale to be held by field units would be one shower bath per three vehicles, one of which would be fitted with holding blocks.

(6) SUMMARY.

(a) A light, durable, improvised shower bath of small bulk is described which would allow of shower ablution for even the smallest bodies of troops in field conditions.

(b) It can be constructed from salvaged material; only simple tools are required and it is well within the capacity of a regimental pioneer.

(c) Water wastage due to carelessness or defective stop cocks is eliminated and each bather is restricted to a maximum of 2 gallons of water.

(d) As all pumps, tube boiler water heaters, pipes, joints and cocks are eliminated, improvisation of a unit ablution house in the field is possible with the aid of a dry standing, an I.P.P. tent for shelter, a water heater, such as a Soyer Stove, a water tank and some simple gantry to hold the shower baths in position above the level of the heads of the bathers.

My thanks are due to the Commandant, Middle East School of Hygiene and D.M.S., G.H.Q., M.E.F., for permission to forward this communication.

Travel.

THE "LLANDOVERY CASTLE."

WITH EXTRACTS FROM THE REPORTS OF MISS A. M. BIRCH, MATRON, T.A.N.S., MISS PAMELA DURRANT, Q.A.I.M.N.S.R., and MISS H. CANT, SISTER, Q.A.I.M.N.S.R.

It is a long time since the editorial staff of the *Journal of the Royal Army Medical Corps* has had the pleasure of printing extracts from the letters of members of the Q.A.I.M.N.S. and T.A.N.S., and it is one of the privileges of the war that we have now received the following. We may add that only the dearth of paper prevents us from using still more of these excellent reports but we hope to be able to give them occasional publicity in the future.

Miss Birch writes as follows :—

No one who has not served in Field or Converted hospitals for three years, can possibly realize with what joy I beheld the steam sterilizers and boilers, with an unfailing supply of hot water. After primus stoves in continuous use, many times packed, and minus spare parts, this was, indeed, heaven. The pantry was an even greater surprise. It appeared to be full of CHINA. Actually cups, saucers and plates sufficient for each patient, to say nothing of knives, forks and spoons with even a small surplus and, what is more astonishing, none of these are missing when inventories are done. Unless one has worked in Palestine, it is impossible to appreciate this particular joy. Apart from a lack of lockers, or kit space, the wards are extremely convenient. The beds compactly arranged with deep Vi-spring mattresses, so comfortable that on one occasion, doing a late round, I found a patient sleeping on the floor with only a blanket beneath him. He assured me the bed was far too comfortable after months of hard desert and begged to be allowed to stay there.

All the beds have green folk-weave counterpanes and white sheets (that have not been dried in a Sudan sandstorm !). Ablution and bathrooms are plentiful with brass and copper fittings, unfortunately, now that polish is almost non-existent.

My first journey was to Tobruk, timed to reach the harbour very early in the morning to enable us to embark our patients and away before 5 p.m. as, at that time, air raids could usually be expected, and were actually seen by us on our return journey, but at a safe distance away. Shortly after dropping anchor some 2 miles from the partially demolished quay, watching anxiously from the deck, we sighted the "Z" Lighter (a large flat barge) bringing our patients. In this, if the stretchers are well arranged, 120 can be carried at one time. The fighting must have been exceptionally hard at this time for we carried back 715 patients instead of the usual 460, the surplus being accommodated in the canvas hammocks slung above the beds, on mattresses on the floor, in all available spaces even to the padded cells, the patients in the latter causing much amusement and facetious remarks from their comrades. The "Z" Lighter securely fastened "aft," our stretcher box was lowered over the side, two patients laid in, one over the other, then carefully guided by the stretcher bearers and by the attached ropes, up and over on to a mattress laid on the deck to prevent any jarring of the fractures. To my amazement this was done at the rate of one a minute so that 120 patients are embarked in an hour. At the

same time, on the other side of the ship disembarking the luggage and equipment of the unit, we invariably carried to their new destination the Sisters eagerly scanning the distant landscape which was to be their new home for many months. As each patient arrived on deck he was seen by the M.O. and given a coloured "tally" to indicate to which ward he was to be admitted. These tallies are carefully collected and returned to the C.O. later and, on several occasions, immediately after sailing, I have discovered Sisters and Orderlies in distress, having 117 patients and only 116 tallies; a hectic search usually ending with the missing tally discovered in the pyjama pocket of a patient with both hands immobilized in plaster, and a sigh of relief all round. I cannot describe the look of utter contentment and relief on the faces of the men when, after a good wash and an appetizing meal, they lie back in those comfortable beds, smoke, read, or sleep until the next meal. The food at this time was excellent, and I shall not easily forget, on one occasion, after feeding a very emaciated, helpless and elderly Serjeant with chicken jelly and custard, cake, and tea, he looked up into my face, and exclaimed breathlessly "Matron! I just can't believe it, it's just like being in heaven." We found it a great help to bring in the "chef" to take a peep round the ward sometimes, and then coax for special titbits for the ones who appeared to have lost all desire for food.

The Blood Transfusion Service in Alexandria is now excellent and we collected a sufficient supply of blood and plasma for each journey. The Surgeon and an Orderly specially trained for this work and Theatre Sister are responsible for all transfusions, relieving the ward Sisters considerably. When I say that, on embarkation days, all Orderlies, with the exception of one in each ward, are taken for stretcher bearing for the greater part of the day, leaving nominal rolls, washing, feeding, urgent dressing (and often 70 out of 100 patients on sulphanilamide tablets, too valuable to be omitted) to three pairs of hands, it will be realized that there is no spare time, and I would like to record that, at the end of practically every voyage, the Commanding Officer has asked me to thank each Sister personally for the magnificent work she has done, from early morning to often very late at night; relieving each other for quick meals and coming on deck for an occasional breath of air, for I cannot describe to you the terrible heat of the wards, with all portholes closed for safety within two days of embarking port, and then, gradually relaxing as we return to safer waters, with two or three portholes open; everyone gives a sigh of relief and less time is needed for mopping one's face.

The rapidity with which the harbours were made safe for us to enter, wrecks cleared or put to use, filled us each time with amazement and praise for the Naval dock workers, particularly at Tripoli, where with incredible speed and ingenuity one enemy ship was turned on its side, secured to what was left of the quay, filled in here and there with cement and posts, making us an excellent landing stage enabling us to disembark our patients from Sicily by the gangway method and with such wonderful co-operation with the Embarkation Officers that 620 patients were away in the ambulances in two and a half hours. The patients always viewed the stretcher box over the side with much apprehension, though perfectly safe, and were delighted with the gangways.

Avalo was some three miles, looking so calm and peaceful, with hardly a sign of life beyond a few lorries running along the coast road, and smoke from fires between the hills, evidence of the raid we had seen late the night before and a long distance away. The first sign that we had been recognized came from Navy House, signalling instructions, and then a hail from an "L" Ship, asking us to take on board an airman they had just rescued from the sea, who, beyond an injury to his shoulder, was in quite good condition. As our first patient he was given a tremendous welcome and breakfast but, poor man, was relegated to the background when the serious work of the day began.

This was indeed "total war." I cannot describe the complete change of atmosphere in the wards. No laughter, greeting of friends, or exchange of hairbreadth experiences; a complete silence reigned. Each patient appeared to be more severely wounded and badly shocked than the last one and, as they were carefully lifted on to the beds, they sank down and were asleep, in spite of their pain, before we could remove their tattered and dirty rags which was all that was left of their uniform. No kit, no possessions. We cannot be grateful

enough to the British Red Cross who provided those marvellous "Front line bags" complete with pyjamas, razors, in fact everything necessary for the moment. We tried very hard to rouse our men sufficiently to take some food, if only fluids, but they persisted they had gone too long without it and only required sleep. It required great control from many of us that day to restrain our tears as we went about the wards, something so new to us after our cheerful patients, always ready for second and third helpings of the food, "such a wonderful relief from bully and biscuits."

I should like to say here that, carrying many thousands of men during the last year, I cannot remember hearing a grumble (or grouse) of any kind, even from the most severely wounded. The nearest to it was a remark from a patient on this trip, who declared he "would rather fight again from El-Alamein to Sfax than go through the last five days in Sicily."

Miss Durrant takes up the tale and adds :—

Next morning we returned to Syracuse and finished loading patients—total of over 600. As the beds in the ship only numbered 450 many patients were lying on the floor on mattresses. Every available space in the wards was taken up with mattresses. Never had we seen such ill and dirty patients. They had lost everything. Some had no clothes at all, others just tattered rags which we cut off. Nobody had washed or shaved since the battle started over a week previously. Here we were so very thankful for the Red Cross who provided every patient with a bag, complete with a pair of pyjamas, shaving kit, toothbrush and paste, soap, flannel and towel, and a packet of cigarettes. After the patients were washed and put into clean pyjamas, all they wanted to do was sleep and drink. Nobody would eat. It was so unusual to see them refuse food. They said "we have been so long without food, Sister, we cannot eat it now—please let us sleep."

As many dressings as possible were done that day. The surgeons were operating far into the night—many blood transfusions were given. I cannot describe the awful heat during this voyage. Never before had we travelled with portholes shut. Our starched caps looked like limp wet rags; our white dresses were continuously wet. What blessed relief to go on deck for a few minutes after meals, for air, but the patients couldn't do this. They had to lie there in that terrible heat. We thought many of them would die before we reached Tripoli, they were so very ill and the heat did not help matters. But we only lost three and they were all prisoners of war.

The following notes are by Miss Cant :—

During many of our trips in the Mediterranean enemy planes approached us, flew round us as though to observe us and then made off to sea again.

Once we hove to in mid-ocean as an object had been seen bobbing about in the water. A lifeboat was lowered away and went to investigate. It was found to be an airman's rubber dinghy—but unoccupied—and was salvaged by the lifeboat's crew.

When we reached Sicily it all looked so peaceful and sounded so quiet, the island basking in the sunlight and no sound of warfare to be heard—the only sign of activity was our own ships going about their lawful occasions as though they had been there for all time.

After the third trip to Sicily we heard that we were going to take invalids home to England. It seemed almost too good to be true and until the last moment we were afraid that something would happen to prevent it. But, sure enough, the day arrived when we took on invalids at Alexandria and actually set sail for home. Many of our patients were men we had brought back from the front line months before and what a joy it was to see them looking so well and so different from the time when we had first seen them.

Many of the patients had amputated or otherwise disabled legs and it was a constant source of wonder to me to see how quick and agile they were in getting about on their crutches and up and down stairs despite the movement of the ship. It was an education to see how they adapted themselves to their infirmities and one man who had both forearms amputated could play cards, smoke a cigarette and feed himself with the aid of temporary wire fittings improvised for the purpose.

One day after we had left Gibraltar far behind, six or seven German planes swooped

round us unexpectedly. They flew round the ship almost level with the rail about twice and (the patients assured me) their crews having waved in quite friendly fashion (they were close enough for their crews to be seen quite clearly) they flew off to sea again. The patients admitted that they felt a little nervous at the time for we would have stood little chance had they attacked us.

[We feel that we owe much for these short notes to the Matron-in-Chief, Q.A.I.M.N.S., and we look forward to publishing more as supplies of paper becomes available.—EDITOR.]

Reviews.

THE SURGERY OF REPAIR INJURIES AND BURNS. By Squadron Leader D. N. Matthews, R.A.F.V.R., M.A., M.D., M.Ch.Cantab., F.R.C.S.Eng. Oxford: Blackwell Scientific Publications, Ltd. 1943. Pp. xii + 386. Price 45s.

This book sets out to cover a very wide field of clinical conditions and some of the sections are of necessity rather brief. The section dealing with long stage repair work for example is a little scanty but, on the whole, the ground is well covered and the author has certainly filled in a bad gap in current medical publications.

For such a carefully prepared and well turned out book some of the diagrams may prove misleading and anyone attempting to use such flaps as are illustrated on pages 131 and 134, fig. d, might very well meet with considerable trouble. Not everyone would agree with the position of the legs shown in fig. 86, page 133. Skin to skin contact of the legs often gives rise to pressure sores and many prefer to use plaster to ensure that there is clearance between the skin surfaces.

It is unfortunate that more mention is not made of the usual rotation flap instead of the Blaskovic's type which the author seems to favour. The latter is not in general use among plastic surgeons as the amount of rotation is so little and the flap is really a direct advancement one.

The section on burns is well done but it is a pity that the part given to tannic acid and other coagulant dressings was not left out altogether. It would appear doubtful whether these procedures have any place at all in the modern treatment of burns.

The book is well got up and provides a large amount of useful information which is not as widely known as it should be. It will give a great deal of help to many surgeons who find themselves confronted with these difficult and often extremely serious cases. G. M. F.

VADE MECUM OF MEDICAL TREATMENT. Fourth Edition. By W. Gordon Sears, M.D.Lond., M.R.C.P.Lond. London: Edward Arnold & Co. 1943. Pp. viii + 388. Price 10s. 6d. net.

The fact that this little volume, which was first published in 1937, is already in its fourth edition, is in itself evidence of its popularity. In a relatively small compass it contains the essentials of modern treatment of all the medical conditions commonly met with in practice in addition to quite a number of the less common diseases. The appendix contains much useful information in tabular form, such as a Posological Table, Caloric Value of Foodstuffs, Normal Figures for Blood Constituents and Cerebrospinal Fluid findings in various diseases.

Owing to its small bulk and the up-to-date information on treatment it supplies, this Manual should appeal specially to the Service Medical Officer.

The only criticism one might make is on malaria. The routine treatment shown requires 2 to 2½ ounces of quinine spread over a period of three months, whereas the present-day treatment of the average case requires only sufficient quinine to bring the temperature down to normal followed by seven days of mepacrine, and then, after an interval of two days, three to five days of pamaquin. The dose of the last drug should not exceed 0.3 gramme daily. The dose mentioned, 0.4 gramme daily, is liable to lead to toxic symptoms in a proportion of cases.

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Journal

OF

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ISSUED



MONTHLY

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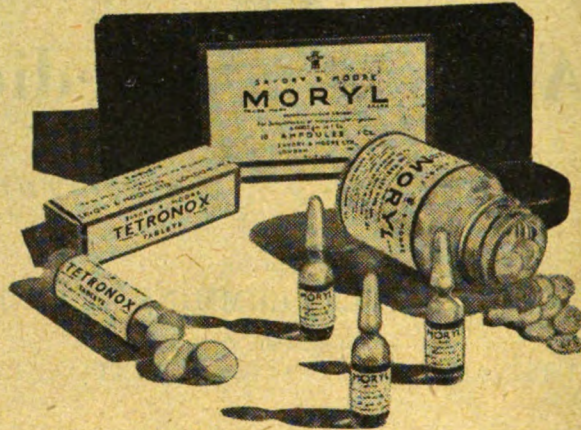
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Original Communications.

A YEAR'S WORK ON THE MEDICAL SIDE OF A WEST AFRICAN MILITARY HOSPITAL.

BY CAPTAIN MOUNTJOY ELLIOTT, M.A., M.D., M.R.C.P.I.,
Royal Army Medical Corps.

WE left England in May, 1941, and, apart from the depth-charging of a whale by one of our escorting destroyers, the journey was uneventful. Our 600 bedded hospital nucleus was an old military barracks, our knowledge of tropical medicine that acquired during a two weeks' course at the London School of Tropical Medicine. From the start we had the co-operation of the local Colonial Medical Officers whose expert advice helped us to solve many of our initial clinical problems. The medical team consisted of an O.C. Medical Division, a graded Medical Specialist and four General Duty Officers. The survey period is from July, 1941, to June, 1942. During this time 10,770 patients were admitted and of these 2,850 were white Service personnel and 7,920 native.

SECTION 1.—WHITE SERVICE PERSONNEL.

Medical cases formed 62 per cent of the total admissions. Table I shows the monthly rates of the six principal medical disease classes. The following were some of the other cases admitted to medical wards: Syphilis (38), Bronchitis (26), Psychoneurosis (24), Jaundice (21), Peptic Ulcer (18), Lymphogranuloma inguinale (13), Glandular Fever (7), Gastritis (7), Organic Nervous Diseases (4).

TABLE I.

Disease	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May	June	Total
Malaria ..	233	228	67	86	39	58	47	45	14	47	68	106	1,038
P.U.O. ..	18	6	2	0	4	0	18	11	21	9	20	57	166
Gastro-enteritis ..	22	3	8	14	18	8	9	12	15	13	22	38	182
Amœbic dysentery ..	0	1	4	4	5	6	3	3	6	7	10	13	62
Bacillary dysentery ..	0	0	0	10	6	6	3	1	6	6	5	13	56
Gonorrhœa ..	7	6	4	7	8	12	12	8	8	8	10	5	95

Malaria.—This disease alone was responsible for 64.5 per cent of the total white medical admissions. Of the 1,038 cases, 567 (54.6 per cent) were admitted during the months of June, July and August. During these months the majority of the odd 200 inches of rain

per annum falls. Malaria was responsible for more deaths and invalidism than any other group of diseases put together.

The Japs having grabbed most of the world's quinine stocks, we instituted as our standard treatment a combined course of quinine and mepacrine hydrochloride. Taking it all round, this treatment worked very satisfactorily. Most of the cases were malignant tertian infections. Quinine gives quicker initial control than mepacrine so that, for the first forty-eight hours, 10 grains of quinine bihydrochloride were given t.i.d. After that, 0.1 gram mepacrine hydrochloride was given t.i.d. for the next five days. On this regime the majority of cases were apyrexial by the fourth day. After a forty-eight hours' rest period, 0.01 gram of plasmoquine was given t.i.d. for four days. In spite of controlled quinine "prophylaxis" many cases of reinfections or relapses were admitted, some patients having six or more attacks in a year. As there is evidence that some people do not metabolise quinine to exert a proper antiparasitic action it would be of interest to use mepacrine as a "prophylactic" and see whether there would be any improvement in the admission rates for malaria. Military statistics suggested an attack rate of 100 per cent per annum and in some parts even 200 per cent but, by means of screening, spraying, drainage, etc., it has been shown that the incidence of malaria can be cut down to infinitesimal levels in this hyperendemic area. These results may be achieved with all static units such as air bases, camps and coastal defence batteries but, in wartime, mobility may render such measures impracticable.

There are certain danger signs which call for a different scheme of treatment. Cases showing "low fever" with muddy skins and slightly jaundiced sclerotics, patients with severe anæmia, oliguria, vomiting, diarrhoea, hyperpyrexia, dehydration, algid symptoms or those with signs in the C.N.S. indicative of an impending cerebral malaria require, in addition to immediate symptomatic treatment, the use of specific drugs in such a way as to bring the infection under as rapid control as possible. If cerebral malaria threatens, I prefer to give 10 grains of quinine bihydrochloride in 20 c.c. normal saline intravenously and repeat four-hourly if necessary. There are few more urgent medical conditions. In the other types of case I used mepacrine hydrochloride, if necessary giving it by intramuscular injection. In urgent cases I prefer to rely on mepacrine as it gives a more uniform and reliable control. The only exception to this is cerebral malaria.

We were disappointed with the results of treating M.T. malaria with sulphadiazine which appeared to have little antiparasitic action.

Cerebral Malaria.—This is a more dangerous complication of malaria than blackwater fever. We had six cases, four of whom died. One patient was a Chinaman admitted off a convoy. He had been in coma for two days without treatment and died soon after admission. The Fleet Air Arm flew me up to a remote jungle outpost to see the next case and on my arrival I found a British serjeant dying in deep coma. The two other patients who died had an apoplectic onset about the fourth day after their attacks started. Few cases recover under such circumstances, the onset of coma usually being a death warrant. It is very important to keep all cases of M.T. malaria under close observation so that signs indicative of involvement of the C.N.S. may be observed at the earliest moment. In this way, it may be possible to prevent the onset of coma by starting immediate intravenous quinine therapy.

The two cases who recovered had initial signs of C.N.S. involvement, one a facial palsy, the other a partial hemiplegia. Other warning signs are excessive tiredness or lassitude, drowsiness, restlessness, intense generalized headache, neck stiffness, ophthalmoplegias, nuclear paresis, mental changes, vomiting, paræsthesias, numbness or motor weaknesses.

We do not know the mechanism underlying this condition. The pathological lesion is the production of emboli composed of wads of parasites and malarial pigments. I observed in one of these cases as many as four parasites in one red blood corpuscle. Such cells must be less resilient than unparasitized corpuscles and therefore less capable of compression. Perhaps the red cell membranes of these patients are tougher than usual and become as logs in a narrow stream and soon begin to pile up one on top of another. The object of treatment is to destroy the parasites as quickly as possible. In addition to intravenous quinine, lumbar

puncture should be carried out. This relieves extraneous pressure on the cerebral capillaries and so helps to widen their bore. Intravenous injections of hypertonic glucose also help by osmotically increasing the intravascular fluid volume. Anticoagulants such as Dicumarol might prove of great benefit in this condition.

Blackwater Fever.—We treated eight cases and had two deaths. One of the fatal cases was a merchant seaman who developed blackwater three days out from port and had improper treatment before admission. He passed $1\frac{1}{2}$ ounces of urine in ten days and died of uræmia. Three of the patients were having their first attacks of malaria.

In blackwater fever the patient hæmolyses his own red blood cells. Without any treatment this hæmolysis may cease and the patient recover. This fact must be kept in mind when treating these interesting cases. The hæmolysis appears to be the outcome of an immunity system set in motion by the introduction of malarial parasites into the body. Recovery takes place if the patient can manufacture sufficient anti-hæmolytic substances. Recent *in vitro* experiments have shown that tissue extracts can stop such an hæmolysis.

There are three principles of treatment. Firstly, to interfere as little as possible with the developing anti-hæmolytic mechanism. Secondly, to encourage the elimination of toxins, pigments and hæmoglobin derivatives by urinary alkalization and an adequate fluid output. Thirdly, to combat anoxia at the right moment by blood transfusion and oxygen therapy.

As blood transfusion may interfere with the first principle of treatment it is worth while to study some points in regard to the hæmolysis. In some cases, the hæmolysis is acute, continuous and severe. In others, it starts acutely and then tails off gradually or intermittently. In the third type the hæmolysis proceeds in stops and starts. A clinical analogy would be a case of hæmatemesis from a bleeding peptic ulcer. It becomes a question of whether to transfuse, when to transfuse and how much to transfuse. The three types of hæmolysis are shown diagrammatically in figs. 1, 2 and 3.

As soon as hæmoglobinuria commences, attempts to step up urinary output should be started. Venoclysis is the most rapid and controllable method. Solutions used are normal saline, bicarbonate saline (sodium bicarbonate 160 grains to the pint) and 2 per cent glucose saline. An average flow rate is 100 c.c. per hour (2,400 c.c. in twenty-four hours). The urine must be kept alkaline throughout the hæmoglobinuria. Glucose is given orally or intravenously to promote diuresis and thus provide ample water for the kidneys to carry any katabolites. If renal output falls, fluid input must be accordingly adjusted to prevent hydræmia. Excretion of 1,500 c.c. of urine daily allows the kidney to excrete accumulated waste material without having to work to maximum capacity. If anoxia and air hunger are acute, oxygen may be given with a B.L.B. mask. As soon as hæmolysis starts, the patient's blood group is determined and the progress of the anæmia determined by red cell counts, hæmoglobin estimations and hæmatocrit readings, at 8 a.m., noon and 7 p.m. In the jungle a simple hæmoglobinometer should be used if more elaborate methods are not available.

The greatest care must be exercised in matching donor and recipient. If possible, cross matching should be done in a water bath at 37° F. to ensure absence of cold agglutinins. The drip should not be started until at least 10 c.c. of the donor's blood has been slowly injected intravenously to see whether any immediate reactions are going to take place. The drip rate should be as slow as possible and the blood flask kept warm by hot water bottles while the transfusion is in progress. One drop every six seconds is an average figure. In remote areas, where facilities for transfusion are non-existent, the necessary apparatus and refrigerated universal donor's blood in specially insulated thermos flasks could be dropped by parachute.

Malaria and Blood Transfusion.—In tropical zones, where malaria is endemic, the transfusion officer's lot is not a happy one. One must assume that all donors both black and white are infected with the malaria germ. Even if there is no previous history of an attack of fever in the donor it is advisable to give a full course of anti-malarial treatment to the recipient. Many Europeans do not develop malaria until they return to the cooler climate of their homeland. The filtration of plasma through Seitz filters may render it parasite-free

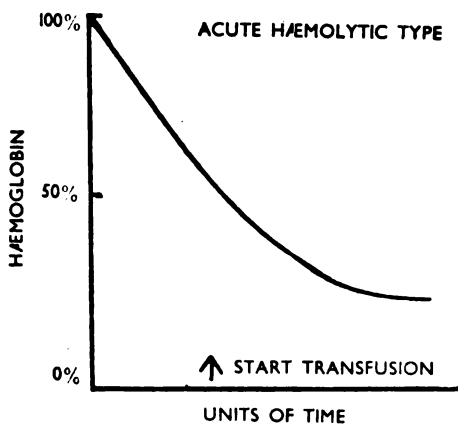


FIG. 1.

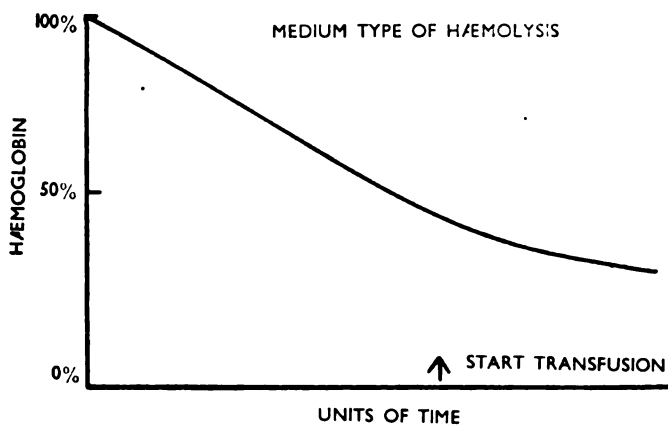


FIG. 2.

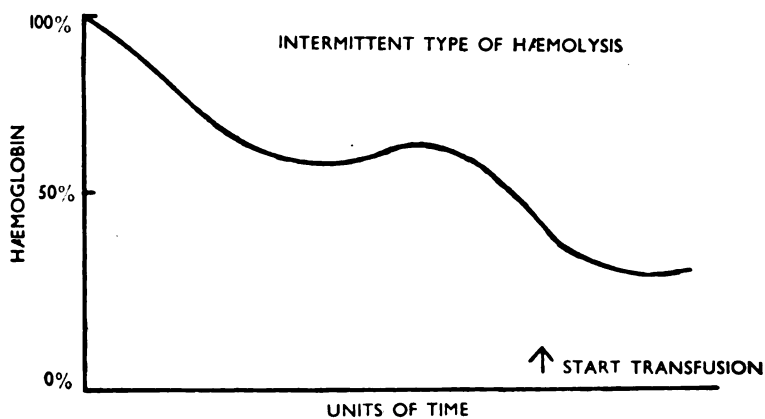


FIG. 3.

but does not remove the malarial toxins. I tried storing malarious blood to which quinine had been added in high concentration but even at the end of four or five days parasites were found in smears taken from the bottles. Air services may in future permit weekly stores of blood to be sent to such areas from healthy donors.

Infusion fluids tend to keep badly in the tropics even when refrigerators are available. Dried plasma and serum are invaluable. Infusion fluids should be made up as required and used at once. All rubber and glass tubing should be stored in airtight bottles and heat sterilized immediately before use. Moulds and fungi soon grow in damp apparatus. After use, all the apparatus should be thoroughly cleaned, slowly dry heated and then stored in the airtight bottles.

Acute Bacillary Dysentery.—Altogether we treated 360 cases of bacillary dysentery, 304 of these being in native troops. There were no deaths amongst the white patients and three amongst the natives. The majority was due to the Flexner group of organisms and was clinically mild to moderate in severity. We confirmed the published work of others in the Middle East as to the value of the sulphonamides in treating this disease. Our results are unstatistical on account of the difficulty in obtaining selective culture media.

Sulphonamide dosage was adjusted in accordance with the degree of diarrhoea and the rate of fluid lost from the bowel. The aim is to maintain a therapeutic concentration of the drug in the bowel for at least four days. I prefer to give sulphaguanidine for the first two days and then to switch over to sulphasuxadine. The higher solubility of sulphaguanidine makes it more effective when the diarrhoea is intense whereas the less soluble sulphasuxadine is more likely to be swept out of the intestinal canal before being able to exert its effects. If the diarrhoea is not intense sulphasuxadine is the better drug. Dosage can be adjusted in accordance with the fluid volume of the stool (*see* Table II).

TABLE II.

Day	Fluid Volume of Stools in c.c. per 24 hours	Drug	Dose in grams	
			Daily	Total
1st	1,000	Sulphaguanidine	36	36
2nd	600	"	24	60
3rd	400	Sulphasuxadine	12	72
4th	200	"	9	81
5th	50	"	6	87

Initial purgation is contraindicated as quicker control and lower dosage of sulphonamide can be obtained if the peristaltic action of the bowel is reduced by opiates during the first forty-eight hours. The water balance must be carefully watched and adjusted.

Amœbic Dysentery.—The diagnosis can only be clinched by a microscopical examination. To aid microscopical identification, the stools should be rendered semifluid by means of saline purges and then sent " piping hot " to the laboratory. Good lenses and a warm stage are often as essential as adequate experience. Clinicians should study amœbæ themselves and not leave it entirely to the pathologist who may be replaced at a future date by an inexperienced newcomer.

We treated 374 cases of which 62 were Europeans. There were no deaths amongst the Europeans and three amongst the natives. Two of the 62 European patients became chronic and were invalided to the U.K. Our assessment of cure was that 6 successive stools should be free of *Entamœba histolytica*. About 30 per cent of the native troops were carriers of *E. histolytica*.

The good results obtained in treating the Europeans may be attributed to three main factors: (1) The patients were mostly young healthy adults who had not been in the tropics for more than two years; (2) the patients were treated early in the disease before extensive lesions had developed in the intestines; (3) a combined course of treatment was given to all patients. The routine treatment was as follows: Emetine hydrochloride 1 grain was given daily by the intramuscular route for the first ten days, supplemented by one capsule of

Amebvan (Evans Biological Institute) morning and evening. A full diet was allowed during this time but, for the second part of the treatment, the patients were put on a low residue diet. On concluding the injections, a welcome forty-eight hours rest period was allowed before the second part of the treatment was started. This has been described by Sir Philip Manson-Bahr in his textbook of Tropical Medicine and consists of a ten-day course of oral emetine bismuth iodide and $2\frac{1}{2}$ per cent yatren retention enemas. The stools should be sieved during the E.B.I. treatment to ensure that the capsules are not being passed undissolved in the stools. One month after discharge the patients were readmitted and a further four stools examined as a precaution against relapse. Sigmoidoscopy of the two chronic cases showed no ulcerative lesions in the part of the bowel examined so that it is likely that these patients had become carriers without extensive bowel lesions. One of them cleared up rapidly on a further course of E.B.I. on his return to England.

From personal experience I know that this is a gruelling treatment but, remembering the chronic ill-health that can result from inadequately treated cases, I think our results fully justified it. We found that several patients had incompletely healed ulcers and positive stools on the completion of the first part of the treatment. We tried giving sulphapyridine to a few cases but were not impressed with the results.

Jaundice.—Like many cases of European jaundice, the ætiology of jaundice in West Africa may be shrouded in obscurity. Some of these patients did not fit in with the classical picture of epidemic jaundice and had proteinuria with epithelial casts in the urine. They may have been cases of modified yellow fever occurring in patients inoculated with Y.F. vaccine. There is good scope for liver puncture studies in these cases. I treated three cases of yellow fever in Europeans in another military hospital. They had received their "preventive" Y.F. inoculations within a period not exceeding two years. The infections were very severe and two of the patients died.

One patient with infective mononucleosis became deeply jaundiced for over two weeks and had a very severe illness.

Medical Out-patients Department.—Here the neurotic loomed largely and ominously. In the tropics one must be very careful to distinguish organic from functional disease. Vitality and the healthy outlook on life are gradually worn down by heat, dampness, the seemingly endless rainy season, boredom, lack of a social life and the severance of home contacts. Exhaustion and anxiety-states formed the majority of the cases. As far as I could determine, these patients made a good recovery on their return home. Borderline cases of neurosis should be sent home and should not be sent back for a further tour of duty as they invariably break down and may become chronic. In peace time, the outlook is entirely different as most of the troops have volunteered for service in this part of the world and are seasoned in the ways of tropical life.

Patients with symptoms of melancholia should receive very careful consideration as suicide may be attempted if they are left to grapple with their difficulties for too long a period. Such cases should be invalidated home at the earliest opportunity. No patient should be labelled psychoneurotic until chronic malaria and amœbiasis have been ruled out by clinical and laboratory investigations. This also applies to venereal disease, sleepy sickness and intestinal helminths. If possible, cases of neurosis should not be admitted for investigation as they are often a source of the wrong kind of medical propaganda for the other patients in the wards. Sternal puncture is probably the best way of detecting latent malaria.

Skin Diseases.—Fungus and coccogenic skin infections are the cause of an enormous amount of loss in working hours amongst both white and native troops. High temperature and humidity levels all the year round (approx. 90° F. and 90 per cent) produce a sodden epidermis which forms a beautiful culture medium for bacteria and fungi. Daily baths, with careful drying of the skin folds and interdigital clefts, followed by the application of a mild antiseptic powder, are useful prophylactics. Skin areas pressed on by equipment and heavy clothing should receive special attention. Most of the lesions are secondarily infected. After numerous trials I hit on the following routine treatment for coccogenic and fungus skin

infections. The first thing is to seal off the affected skin from the air and thus prevent exogenous reinfection. To do this, a triple dye solution of the following composition is painted on to the affected areas three times a day.

Methylene blue	..	1/400	—
Gentian violet	..	1/400	aa
Acridlavine	..	1/1,000	equal parts

When each application has dried a film of Tannafax jelly is applied. The treatment is continued until a good protective crust has formed. If possible the lesions should be left exposed to the air, otherwise sterile dressings should protect the crusts. The infection is also tackled from within by means of sulphathiazole given as three tablets t.i.d. for six days. A mixed and fully vitaminized diet is helpful in preventing these infections getting a good hold.

Analysis of Deaths in White Service Personnel.—There were eight deaths due to medical causes for the period under review. These are shown in Table III.

TABLE III.

Disease	Cases	Died
Cerebral malaria	6	4
Blackwater fever	8	2
Acute medullary encephalitis (unknown ætiology)	1	1
Chronic ulcerative colitis-perforation-peritonitis	1	1

Causes of Invalidism amongst White Service Personnel.—This means invaliding back to the U.K. and not necessarily out of the Service. The ten principal causes are shown in Table IV. Out of this total of 99 cases, 69 or 69.7 per cent were medical cases.

TABLE IV.—INVALIDED HOME

Disease	Cases	Disease	Cases
Chronic malaria	21	Organic nervous disease	7
Psychoneurosis	17	Chronic bronchitis	6
Arthropædic	15	E.N.T. diseases	5
Malaria with other medical conditions	10	Phthisis	4
Eye diseases	10	Peptic ulcer	4

SECTION 2.—NATIVE SERVICE PERSONNEL.

Total in-patients numbered 7,920 for the period of review. The twenty-four principal diseases responsible for the 6,140 medical cases admitted formed 77.5 per cent of the total native admission rate.

Before embarking on any individual discussion of these various ailments it is worth while considering the average native patient from the West African colonies. The student of tropical medicine soon learns that not only is the native subjected to an enormous amount of endemic disease but that his flesh and blood are defensively weak against many of these diseases. The bodily substance, of poorer quality than that of the average European, may be the outcome of centuries of inbreeding, poverty, starvation and improper or absent hygiene and sanitation. Malaria, hookworm, yaws and amœbic dysentery are constantly sapping his bodily reserves of defence against the innumerable foes of nature which surround him. It is rare to find a native patient suffering from only one disease. A patient is brought in with a fractured femur. Examination will show that he may have chronic malaria, hookworm anaemia and a colon ravaged by the feasting of *E. histolytica* over many months or even years. It is no wonder that his fracture may heal slowly or union be of poor consistency. We would not accept such a standard of health normality for the cattle in Great Britain. The New York negro escapes most of the diseases which afflict his jungle brethren because he is forced to live under good hygienic conditions and to eat a better balanced diet.

Tropical Ulcers.—To my mind a tropical ulcer is like a hole in a rotten pear. The surface of the pear breaks down because the underlying flesh of the pear is rotten. For this reason, the treatment of these ulcers is not a purely surgical matter. No one has ever discovered a specific

ætiological agent nor are they likely to until all the destructive forces to which native flesh is subject have been removed. In other words, it is a question of prevention being better than any cure. The white man who has lived for years in this part of the world never gets a tropical ulcer nor do the inmates of Harlem. A good vitaminized diet and the elimination of associated diseases are every bit as important in treatment as are plaster of Paris, chemotherapy, skin grafting and Elastoplast.

Pneumonia.—There were 291 cases with six deaths. These figures pay testimony to the great effectiveness of the sulphonamides. After forty-eight hours treatment it was not unusual to find the patients hopping around the wards with consolidated lobes as happy as sand boys. A small number of the patients did not respond to sulphonamide therapy and were probably cases of atypical pneumonia. Most of these were pyrexial for three or four weeks and had no leucocytosis. Even when the temperature had reached normal levels there was a tendency for fluffy areas to persist in the X-ray pictures for many weeks after but eventual recovery was complete.

The only complications met with in the coccogenic pneumonias were two cases of empyema. One of these rapidly cleared up after 6 grams of sulphapyridine had been injected into the pleural cavity on two occasions at an interval of three days. I would like to re-emphasize the importance of giving the sulphonamides in high dosage during the first two or three days of treatment. At least 6 grams daily should be given for the first seventy-two hours, the tablets to be given four-hourly throughout the day and night. This will prevent the organisms becoming drug fast, a serious complication.

Dracontiasis.—Guinea-worms were only met with amongst the troops from Nigeria. They were a source of much invalidism and disability. The author has described, in a separate paper, the good results obtained by treating these cases by means of parenteral injections of Phenothiazine. (*Trans. Roy. Soc. Trop. Med. and Hygiene*, vol. xxxv, No. 6, pp. 291-301.)

Bilharziasis.—109 cases were admitted. The majority were cases of *S. haematobia* infection producing endemic hæmaturia but a few cases of dysentery due to *S. mansoni* infection were encountered. Some patients had *S. mansoni* in the stools without appearing to suffer any adverse results.

Yaws.—Some native patients had strongly positive Kahn reactions. The assumption that all these patients may be suffering from yaws or syphilis is usually correct but it should be remembered that other diseases such as active malaria may give a temporarily positive reaction. If one cannot obtain an accurate history it may be a little difficult to distinguish latent yaws from latent syphilis. In such cases the therapeutic test of treatment will have to be carried out. If the patient is suffering from yaws the serum titre will fall rapidly after a few injections of arsenic and bismuth. The common yaws lesions we came across were frambæsiiform skin lesions, dermatitic patches suggestive of dermal leprosy or ringworm, juxtaarticular nodules, vitiliginous patches marking the sites of old healed ulcers and ganglia of the wrist. Hard painful masses suggestive of deep muscle abscesses were often found to be due to yaws. Some of them were excised in the belief that they were inflammatory *Onchocercus volvulus* nodules. Two interesting cases of polycystic bone disease with positive Kahns were treated. Cysts were present in the long bones, the ribs and the skull. These corresponded to similar cases described amongst the aboriginal tribes of Northern Australia.

Deficiency Diseases.—Many patients were in a state of latent hypovitaminosis. Xerophthalmia, perleche, glossitis, gingivitis, and pellagroid skin states were common enough. A few cases of beri-beri, some with cardiac lesions, were treated and cases of peripheral neuritis without anæmia were seen. The addition of vegetables and Marmite to the simple diet of rice and palm oil produced improvement but severe cases required the addition of specific vitamin concentrates.

Cerebrospinal Fever.—This proved to be the cause of the highest death-rate amongst the native patients. There were 47 cases with 6 deaths, a mortality of 12·8 per cent. Some of the infections were of a fulminating character and of very sudden onset. It was not unusual for cases to be picked up unconscious on the road or in barracks. Some of these acute cases had no neck rigidity and the diagnosis had to be made by an examination of the C.S.F. The

failure of chemotherapy to save some of these patients was due to a coincidental encephalitis. No cases of the Waterhouse-Friedreichson syndrome were seen.

Ju Ju.—Native troops would arrive at the out-patient's department with aphasia, deafness, blindness or paralysis. Around their wrists one might observe bands of woven grass, protective emblems against further assaults by the evil spirits. This is the primitive man's way of exhibiting neurosis, hysteria or plain malingering. Many believe themselves to be genuinely bewitched by an evil spirit. To deal with such cases, the physician must turn witch doctor and for the moment ignore the perils that the Hippocratic oath holds in store for all who practise magic and quackery. To use verbal persuasion is a waste of time even if one did understand the lingo. In cases of malingering, the stoppage of pay and food will often cause the blind to see and the lame to walk. This crude and harsh treatment is founded on the simple philosophy that, if you cannot see or walk to your pay or food, it can be of no use to you. Such simplicity appeals to the native mind. Usually about the second day of the treatment, on inquiring of the patient how he feels, the answer is—"me see or walk small small better sah." In another twenty-four hours the cure is complete.

If malingering is not the cause of the trouble, more powerful magic must be produced. Insulin is powerful magic in that it can produce hypoglycæmic convulsions. Here your argument is that you can shake out the evil spirit by your own powerful *ju ju*. Such magic will shake the "divil" out of most natives. The convulsions are the manifestations of the inward struggles of the good and the evil spirits. This was the only way I was able to cure one patient who was functionally both deaf and dumb. We never had to call in a witch doctor for a consultation!

Analysis of Deaths in Native Persons.

There were 55 deaths amongst the 7,920 in-patients. There were 25 deaths amongst the 6,140 medical cases. An analysis of these deaths is shown in Table V.

TABLE V.						Cases	Deaths
Disease							
Acute infective meningitis	..	..	..	..	..	50	7
Acute infective pneumonia	..	..	..	..	..	291	6
Pulmonary tuberculosis	..	..	..	..	..	34	5
Bacillary dysentery	..	..	..	..	..	304	3
Amœbic dysentery	..	..	..	..	..	312	3
Paratyphoid B septicæmia	..	..	..	..	..	1	1

CAUSES OF INVALIDISM (BOARDING BACK TO HOME COUNTRY) OF NATIVE SERVICE PERSONNEL.

The six main causes are shown in Table VI.

TABLE VI.						Cases
Disease						
Pulmonary Tuberculosis	..	..	..	..	..	10
Mental diseases	..	..	..	..	..	6
Eye diseases	..	..	..	..	..	4
Leprosy	..	..	..	..	..	4
Chronic septic lesions	..	..	..	..	..	3
Filariasis	..	..	..	..	..	3

SUMMARY.

A brief account of the kind of work one has to do in a mixed West African Military Hospital of 600 beds is given. The work is of an extremely varied nature. Malaria is still the main cause of illness amongst European troops. Cerebral malaria may be a more dangerous complication of malaria than is blackwater fever. Some points in connexion with the treatment of blackwater fever and the dysenteries are mentioned.

The high incidence of disease amongst natives will be maintained so long as their living conditions are kept at such a low level. Army life has given many native soldiers improved living conditions to the betterment of their health and physique. Preventative medicine offers great scope for improvement in the health of our native African troops.

PROBLEMS OF SURGERY IN THE FIELD.

BY SURGEON LIEUTENANT JEAN LIMBOSCH,

Belgian Army.

DURING the three weeks Belgian campaign of 1940, the author had very considerable reason to realize that a surgeon, however experienced in peacetime surgery, in war is liable to be faced by problems entirely new to him. His intention in this paper is to discuss the management of some of the more common types of casualty reaching the advanced surgical unit; his hope is that it may be of service to some of the younger surgeons who have still to face their first battle experience.

The principles and technique of surgery are the same in war as in peace. The difference in war is in the type of casualty to be dealt with and in the conditions under which the work must be carried out. The responsibility of the surgeon at the advanced surgical unit cannot be over-emphasized. On him depend the future of countless lives and limbs. His work is difficult and extensive, calling for the finest judgment. There is no place for an inexperienced surgeon in the advanced surgical unit.

In my experience most of the casualties reached the first surgical station from three to eight hours after the time of their injury. The first aid treatment had, on the whole, been good. In spite of our improved methods of treating shock, of improvements in anaesthesia, of the potency of the sulphonamides in combating infection, in spite of all the experience gained from previous wars, the mortality of abdominal wounds coming to operation remained in the region of 50 per cent. It is my firm belief that this mortality is too high and that it must be improved. I am convinced that many cases could have been saved by better technique and by better pre- and post-operative care and I believe that if personal or "team" statistics were kept they would show very different mortality rates.

I am well aware of the difficulties inherent in the first surgical station in a war of movement. It has to be mobile (my own station moved seven times in twenty-one days) and yet to be fully equipped for the most varied and major surgical undertakings. The orderlies should be well trained and efficient and must be able to stand the utmost strain. In my own unit, about eighty cases were admitted and operated upon on the first day of the war. It is in such times of strain that a surgeon, working for the first time under appalling conditions, is liable to make costly mistakes.

The sorting of casualties into different degrees of urgency, which has probably been carried out in part before they reach the advanced surgical unit, must be checked and the order of cases for operation must be settled. This is not easy when casualties are pouring in.

HOW TO SELECT CASES.

Firstly, the hopeless cases should be picked out. This is not as easy as one might think. Some hopeless cases, if seen early, look like having a chance and may not show symptoms of severe shock until a number of hours after injury. I well remember seeing a gunner brought in on a stretcher smoking a cigarette and talking unconcernedly. Examination showed that both legs and his right arm had been blown off. Although no tourniquet had been applied, his stumps were not bleeding nor was he complaining. Signs of hopeless shock developed only later.

Secondly cases of limb wounds, where a tourniquet has been applied, must be dealt with. Occasionally the tourniquet has been unnecessary and, in any case, its retention may endanger the function if not the life of the limb. Abdominal and thoracic wounds should then be sorted out, followed by subcutaneous injuries of the abdomen, fractures and finally wounds of the soft tissues.

However urgent his operation, no patient should ever be rushed straight to the operation theatre. I have seen casualties taken directly from the ambulance to the theatre and consider this to be unwarrantable. Time is essential for resuscitation before operation in all

cases of shock or hæmorrhage and is often well spent in making a more accurate diagnosis of the injury. By this means an operative exploration may even occasionally be avoided.

I found that in many cases it was impossible to distinguish between pure shock and internal hæmorrhage. In cases of obvious abdominal injuries, of open chest wounds and of severe limb injuries if signs of shock are evident, it is wise to assume that both shock and hæmorrhage are present. In either case, treatment consists of rest, warmth, morphia, elevation of the foot of the bed and of intravenous infusion. In certain cases however, the differential diagnosis between the two conditions must be made; in cases of blast injury, for instance, with severe signs of shock and indefinite abdominal symptoms. In such cases, it is essential to diagnose a progressive intra-abdominal hæmorrhage at the earliest possible moment and in this respect repeated rectal examinations may be of the greatest assistance.

THE MANAGEMENT OF SOME COMMON WAR WOUNDS SEEN IN THE ADVANCED SURGICAL STATION.

As a golden rule the surgeon must bear in mind that his first duty is to save life. He must use the least traumatic, the least shocking and the simplest effective methods of treatment. This rules out strenuous searches for small foreign bodies, primary suture of contaminated wounds, however carefully they have been excised, intestinal resections where closure of perforations will suffice and resections of the colon where exteriorization is simpler and safer.

Brain injuries should not, in my opinion, be treated in an advanced surgical station. After operation such cases cannot be moved for several days; they are better transferred at once to the neuro-surgeon.

Severe facial injuries should be similarly transferred to the plastic surgeon. However urgent and tempting a preliminary repair may seem it is better not to interfere. The final plastic repair may be jeopardized by a too thorough cleaning and revision of the wound. I saw two cases of very severe facial injury. In each the face below the level of the eyes was nothing but a ragged cavity; shock was absent and both men walked into the station unaided. Some cleaning of the wounds was thought advisable and anæsthesia was induced by means of Evipan. Both men died on the table.

Chest Wounds.—Some cases of open chest wounds reach the advanced surgical station in good condition with little dyspnœa or signs of shock. When such cases come to operation it may be tempting, after excision of the wound, to extend the incision along the intercostal space, divide one or more ribs and so gain access to the whole side of the thorax and to the diaphragm.

This may yield brilliant results but it has a considerable mortality. I believe it wiser merely to excise the wound, to close it and to drain the pleural cavity through a separate stab incision. As one is unlikely to be able to keep a closed drainage working subsequently open drainage is to be preferred.

In cases of chest wounds complicated by hæmorrhage it is well to remember that considerable bleeding may come from the chest wall. If the hæmorrhage comes from the lung itself it is likely to cease as the lung collapses. If it does not do so, the alternatives are deep catgut sutures or packing; in either case the prognosis is bad.

In certain cases wounds of the chest give rise to abdominal signs. Tenderness and rigidity may be present on the corresponding side of the abdomen. This rigidity does not involve the whole abdomen unless there is also some intraperitoneal lesion. Here again repeated examination of the abdomen for the spread of rigidity and of the rectovesical pouch for an accumulation of blood may be very helpful. In doubtful cases showing mild abdominal symptoms it is better, in my opinion, to deal first with the chest and to watch the patient closely thereafter for the development of signs of intraperitoneal damage, particular attention being paid to the spread of the area of tenderness and rigidity and to the findings of repeated rectal examination. If these signs become positive laparotomy should be carried out immediately.

Abdomino-thoracic Wounds.—These may present peculiar difficulties. In some cases the diagnosis is obvious when, for instance, gut or omentum protrudes through the chest wall.

In other cases the diagnosis may be exceedingly difficult. There may be an obvious chest wound with vague abdominal symptoms or, in other cases, although a line joining the wounds of entry and exit may point to abdominal injury, there may be no abdominal symptoms. In such cases the judgment of the surgeon will be taxed to the utmost. If he adheres to textbook teaching he will embark on a combined operation for exploration of the thorax and abdomen through the diaphragm and the patient will probably die on the table.

In tackling such a problem it must be borne in mind that the abdominal injury is the more serious. It is therefore of paramount importance not to allow an abdominal injury to remain unexplored. In such cases a distinction must be drawn between left and right-sided injuries. It must be remembered that the highest part of the liver reaches almost to the level of the nipple. It follows that in any penetrating wound of the right lower chest the liver may be involved whether signs of peritoneal irritation are present or not. I have had to deal with a soldier who had an open chest wound by shell splinter involving the eighth right rib posteriorly. Right-sided abdominal tenderness and rigidity were present with only a slight degree of shock. I excised the wound and, without attempting to explore the chest, packed the pleural cavity with gauze because of considerable hæmorrhage. I then explored the abdomen but found no intraperitoneal damage. The patient was fairly comfortable the following day and was evacuated.

The management of such cases is open to discussion. Here was a man with an open chest wound, with a foreign body in either the pleural cavity, the lung or the liver. X-rays were not available. Right-sided abdominal signs were present without those of intraperitoneal hæmorrhage. Would it have been better to explore the chest widely to visualize the upper surface of the diaphragm? In other words, in case of doubt, is it less shocking to explore the thorax, the chest being already open, or to deal with the wound locally and do a subsequent quick laparotomy? On the other hand, in the presence of definite signs of liver damage or internal hæmorrhage with tenderness of the rectovesical pouch, will an exploratory laparotomy help the patient? In such a case as I have described the injury is likely to be to the upper or posterior part of the liver and an abdominal approach will be unsatisfactory. The inferior and anterior surfaces of the liver can be explored satisfactorily from the abdomen but not the posterior surface. This can be better dealt with from the thorax.

How should one deal with similar injuries on the left side? I saw such a case in which gut and omentum were protruding through a wound in the left lower chest between the apex of the heart and the splenic area. There was no obvious damage to the protruding bowel nor were there signs of lung injury or of involvement of the general peritoneal cavity. The case actually did not come to operation. How should one tackle such a case? Should one excise the chest wound, replace the bowel and close the diaphragm from above or is it wiser to add laparotomy and close the diaphragm from below? X-rays would help to simplify such cases, particularly in localizing foreign bodies, but unfortunately were not available at the time.

Abdominal Wounds.—Here more definite rules can be laid down and I would refer the reader to Mr. Rodney Maingot's excellent recent article on the subject. The length of the incision must be adequate, ample room being provided for complete investigation of the abdomen. A long incision produces less shock than forcible traction used to expose outlying viscera through a small incision. The longitudinal incision through the inner body of the rectus is a good one, being easily extended and time-saving. I also like the transverse incision cutting across both recti, which gives an exposure second to none, though the epigastric vessels may be troublesome.

After the peritoneum has been opened, the first step is the control of hæmorrhage. Thereafter a thorough exploration of all the peritoneal and certain of the extraperitoneal viscera must be carried out. Often damaged intestine presents in the incision and it is tempting to start repair at once. This is most unwise and should always be preceded by a thorough investigation of the other viscera. It is important to realize that lacerations of abdominal viscera are not necessarily produced directly by the missile itself. I have seen a case of very extensive peritoneal damage, with several feet of small intestine entirely detached from the mesentery, caused by a single rifle bullet fired at short range. The damage could not have

been caused only by the bullet. The velocity of a bullet fired at close range is such that its impact on the abdominal wall may produce explosive effects inside the abdomen. The exploration of the abdomen must therefore be complete and yet rapid. These patients cannot stand prolonged anaesthesia and processes of repair are in themselves time-consuming enough.

Small Intestines: Localized injuries to the small intestine away from its mesenteric border can be quickly and safely closed by a simple suture and reinforcement with a piece of omentum. Resection should be avoided where possible because it takes additional precious minutes.

Large Intestines: Small perforations of the large intestine should be treated by simple suture and reinforcement. Under no circumstances whatsoever should resection and anastomosis of the large bowel be practised in war surgery. This procedure may still have its adherents in civil practice but, in war surgery where prolonged preparation of the patient for operation is impossible and where post-operative care may perforce be limited, it carries too high a mortality. Thus a colon which cannot be safely sutured should be exteriorized. When the patient's condition is grave a simple loop colostomy is quick and safe. If the patient's condition admits, a modified Paul Mikulicz' operation should be performed. Such a colostomy saves the patient much trouble if he survives. Its subsequent closure presents no danger whereas the closure of a loop colostomy is a considerable procedure. If effected extra-peritoneally a faecal fistula is not uncommon; if intra-peritoneally, the conscientious surgeon's sleep is not entirely carefree for several nights.

Other injuries.—Injuries to the stomach are treated by suture; rarely is any form of gastric resection required. In such cases extensive damage to liver, pancreas and other organs is likely to be present. Injuries to the spleen are treated by splenectomy. The method of dealing with lacerations of the liver by the insertion of catgut sutures parallel to the edges of the lesion prior to suture, as advocated by Grey Turner, is a most useful one.

Silk is the most useful material for abdominal surgery but I prefer to use catgut for the subcutaneous tissues. Asepsis in war surgery cannot be as complete as in peace time and the infection rate, in spite of chemotherapy, is bound to be higher. The quickest and safest way of closing the abdomen is to use strong interrupted through-and-through silk sutures, as described by Lambotte,—skin, muscles, peritoneum on one side; peritoneum, muscle, subcutaneous tissue on the other side; subcutaneous tissue, muscle, peritoneum again on the first side, and, finally, peritoneum, muscle, skin. This is a quick and reliable method of suture where speed is important.

The bladder is not infrequently injured in penetrating wounds of the lower abdomen. If the patient has not passed urine since his injury, a catheter should always be used. Exploration of the kidney is warranted only by increasing local or general physical signs, by persisting or increasing haematuria or by the presence of a large haematoma in the flank.

Limb and Soft Tissue Injuries.—The treatment of contaminated wounds of the soft tissues by excision, the insertion of sulphonamides and complete immobilization, is now well tried and generally accepted. When faced for the first time by such injuries one is often surprised at the extent of the necessary procedure. I confess that I was sometimes embarrassed by cases which at first sight seemed commonplace and I feel that more definite indications for the management of such cases as follow would be helpful.

(1) Perforating bullet wound, the wound of entrance being below the right great trochanter, the wound of exit being at the left costal margin. X-rays showed no bony injury and there were no signs of intraperitoneal damage, but the whole anterior abdominal wall was grossly contused. Should such a track be laid open and excised throughout its length or was the surgeon wise in dealing with the wounds of entrance and exit and in draining the abdominal wall by a small incision?

(2) I had to deal with a soldier both of whose buttocks had been perforated by the same bullet. I opened both tracks and found extensive damage, the gluteus maximus being greyish and lifeless for about an inch on both sides of the tracks. Having excised all the damaged tissue, I packed the remaining trench lightly and sutured the subcutaneous tissues and skin over the packing, allowing drainage by the four orifices. Sutures in such a case,

even with drainage, are dangerous and I believe now it would have been better to leave the wounds open.

(3) An even more common case is a through-and-through bullet wound of the thigh. I remember such a case, in the upper third of the thigh, in which both wounds were quite neat, that of exit being larger and slightly irregular. In this case both the wounds were excised only. Is this enough? In view of the difficulty and danger of a complete excision of such a track, I think most surgeons would agree that it was, but what is the chance of a serious infection starting in the depths of the wound?

I saw a similar case complicated by a fracture of the femur. This man had been hit by a high velocity bullet from a fighter plane. The fracture was transverse, with a few small separated bone fragments, and the bullet had not been deflected by the bone. There was little bleeding and no swelling of the thigh. In such a case, should one open the thigh widely, to excise the track and remove the bone fragments, if completely loose, from the periosteum, thus causing considerable shock, or was it safe merely to excise and lightly pack the wounds before applying a hip plaster?

(4) Another difficult decision has to be made in the case of multiple injuries of the soft tissues. These are usually inflicted by the explosion of grenades. Cases are seen in which the man has been hit by a dozen or more splinters. Each in itself is not serious but contains a fragment of grenade casing. I have seen such cases in a very severe state of shock after operation. Excision of a dozen wounds takes a long time. It is better to institute thorough shock therapy for several hours in these cases; then to undertake operation with several surgeons working at the same time.

(5) Severe crushing injuries of the limbs call for the greatest surgical judgment. If a man arrives eight to ten hours after a severe crush injury of the leg and the surgeon, fearing gas gangrene, amputates the limb in the presence of shock, the patient will almost certainly die on the table. The outlook is very much improved by a few hours purposeful shock treatment. Better a live patient running the risk of gas gangrene than an immediate fatality.

The problem of amputation or conservation of a badly injured limb is one of the most difficult which the surgeon has to face. In civilian surgery, where constant post-operative supervision is possible, there is a natural and justifiable tendency to conservatism. Even in the best surroundings such conservatism has occasionally cost a patient his life. In war surgery risks of infection are greater and post-operative care may be of necessity sketchy, either owing to the numbers to be treated or on account of difficulties in transport. The tendency should therefore be, in cases of doubt, to amputate. No definite rules can be laid down, however, because sometimes a limb must be amputated, even when its main blood supply is not severed, and conversely a limb with a good collateral circulation can occasionally be saved although its main arterial supply has been divided. In war surgery, therefore, conservative principles must be modified. When in doubt amputate above the damaged area.

I have twice seen a guillotine amputation performed through a badly soiled wound. One of these cases was a badly smashed elbow and the other a very severe wound of the lower third of the thigh. Both were brought in within six hours of the injury—both died of gas gangrene within twenty-four hours. This is a very grave mistake. Amputations should be performed through healthy tissue above the injury, with a tourniquet, at the root of the limb. It takes very little time to cut skin flaps and these should be loosely approximated after the application of sulphonamide powder. Wounds of joints should be excised down to and including the synovial membrane and the cavity of the joint should be explored and irrigated with sulphonamide solution. The articular capsule should be closed with catgut without tension, drainage effected and the limb immobilized in plaster.

SUMMARY.

(1) Cases seen in the advanced surgical stations of field warfare call for the greatest surgical skill and judgment.

(2) Many of the injuries are not encountered in civilian surgery.

(3) The management of a number of cases actually encountered in the Belgian campaign is discussed.

THE ELECTRICAL PREPARATION OF SODIUM HYPOCHLORITE. A SIMPLE METHOD OF PREPARING AN EFFICIENT GENERAL ANTISEPTIC.

BY CAPTAIN E. S. ANDERSON,

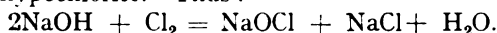
Royal Army Medical Corps.

DURING the summer of 1942, some local shortage of issue antiseptics was experienced and it was decided to devise, if possible, a cheap and trouble-free method of preparing a substitute which could be applied by any Medical Officer in his own M.I. Room. The choice fell on sodium hypochlorite which presents the following advantages:—

- (i) It is non-irritant and may be used at full strength if required.
- (ii) As prepared below, it is sufficiently stable to keep for a considerable length of time.
- (iii) It is a powerful bactericidal agent, its action being due to the liberation of chlorine and nascent oxygen.
- (iv) The starting point of the process, common salt, is always procurable.

The essential principles underlying the method are well known and a theoretical description of the reaction may be found in any standard chemical textbook. It has been applied commercially for some years, there being several electrolytic hypochlorite solutions for sale in the open market, mostly of excellent quality. The method to be described, however, demonstrates how easily the reaction may be carried out with a minimum requirement of equipment and the product obtained is similar to commercial preparations in its antiseptic properties whilst its cost is negligible.

Theory.—Common salt solution is electrolysed. Sodium is liberated at the cathode (—), and chlorine at the anode (+). The sodium reacts immediately with water to form caustic soda, free hydrogen being evolved, and the chlorine interacts with the caustic soda to form sodium hypochlorite. Thus:—



It will be seen that one molecule of NaCl is regenerated for each molecule of NaOCl formed.

This represents the process under ideal conditions but, in practice, the percentage yield of hypochlorite is relatively small and a number of side reactions take place resulting in the formation of other compounds, the most important of which is sodium chlorate. These by-products, however, do not impair but tend rather to improve the antiseptic action since they are all powerful oxidizing agents.

In evolving the method employed, it was decided from the commencement to standardize three factors: (a) The source of electricity; (b) the time of electrolysis; (c) the volume of solution used.

The reason for this is the aim at producing the highest yield of hypochlorite for the maximum economy in electrical energy required and time spent. In the final series of experiments two concentrations of salt solution were employed—10 per cent and 15 per cent. These were found to give the best results under the prevalent experimental conditions. It is left to the individual worker to choose his own concentrations and temperatures. These factors will shortly be discussed.

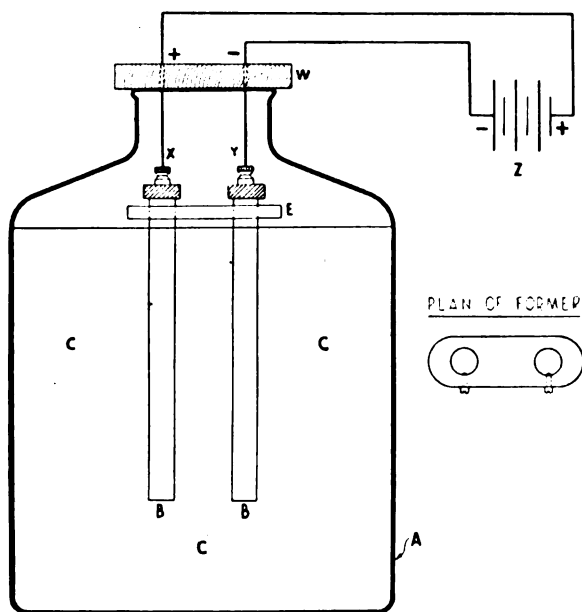
DETAILS OF THE PROCESS.

(1) *The Container.*—This should be of glass or some other inert insulator. Metal is unsuitable since it takes part in the reaction and is corroded. The writer utilizes a two-gallon glass cask such as those used for storing sulphuric acid and distilled water. The internal diameter of the neck must not be less than 2 inches (fig. 1).

(2) *The Electrodes.*—Carbon rods are used. Those employed are obtained from exhausted telephone dry batteries and measure 7 to 8 inches in length and $\frac{1}{2}$ inch in diameter.

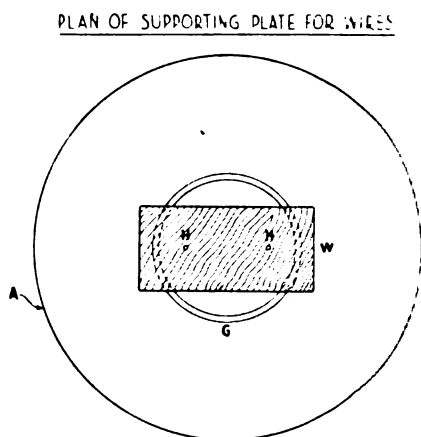
(These particular rods came from old Italian telephone cells.) Some care must be exercised in separating the carbon from the body of the cell since it is easily broken. The best method is to saw longitudinally through the cell so that the line of the cut lies just external to the rod which may then be withdrawn with ease. These rods have a brass cap at one end and to this is soldered a small terminal; the metal below the contact gap of the terminal is then painted with shellac or some other protective varnish. Unless this is done the solder will be rapidly attacked by chlorine and converted into a putty-like paste of chlorides which have a high electrical resistance and cut down the current available for electrolysis.

It is found in practice that the anode disintegrates and finely powdered carbon is deposited on the floor of the container. This disintegration is relatively slow, however, and, with care, an anode will be useful for up to 20 gallons of solution.



- A GLASS CONTAINER
- B B CARBON RODS WITH BRASS CAPS (SHADED)
- C SALINE SOLUTION
- XY CONNECTING WIRES
- Z 6 VOLT 125 AMP-HR BATTERY
- W WOODEN PLATE THROUGH WHICH WIRES PASS

FIG. 1.



- G TOP OF GLASS CONTAINER
- W WOODEN PLATE
- HH HOLES THROUGH WHICH CONNECTING WIRES PASS
THESE HOLES MUST BE SUFFICIENTLY SMALL TO ENSURE THAT THE WIRE WILL BE A FAIRLY TIGHT FIT AND WILL STAND THE WEIGHT OF THE RODS WITHOUT SLIPPING THE DEPTH OF THE ELECTRODES IS ADJUSTED BY PUSHING IN OR WITHDRAWING THE WIRES THE HOLES SHOULD BE FAIRLY CLOSE TOGETHER BUT NOT SO CLOSE THAT THE ELECTRODES TOUCH EACH OTHER
- E EBONITE FORMER FOR RODS

FIG. 2.

The cathode slowly acquires a deposit of an insoluble white substance—probably lime from the water—and, as this is a poor conductor, it is necessary periodically to clean this electrode with an abrasive—a few minutes work—after which it is wiped, washed and ready for use. A small vulcanite former is used to maintain the carbons at a constant parallel distance of $\frac{1}{8}$ inch. This is fixed up as shown in fig. 2. It is not absolutely necessary but ensures a relatively constant current and prevents the electrodes from shorting. The connecting wires pass through a piece of wood placed across the top of the vessel. The rods are immersed to within $\frac{1}{2}$ inch of the former.

(3) *Battery*.—The best battery for the purpose is the 125 amp. hour, 6 volt, accumulator which is issued for radio use. These batteries are easy to obtain since they are issued to all

units and their recharging is carried out by the unit charging plant. No resistance need be employed since the current supplied without reduction is most suitable. A fresh battery is desirable for every two gallons and in any case not more than four gallons should be electrolysed from one charge.

(4) *The Salt Solution.*—Better results are obtained with 15 per cent than with 10 per cent NaCl. Ordinary coarse issue salt is used, dissolved in the minimum volume of warm water, and made up to the required volume and temperature by the addition of more water. Filtration is not necessary since the solution rapidly clears itself during electrolysis. The amount of NaCl required for 15 per cent in 2 gallons is fairly accurately measured by filling a deep 6 inch drinking bowl (as issued to troops) with salt well heaped up above the level of the rim. The weight of salt contained is then about 3 pounds.

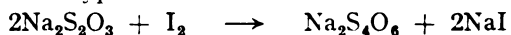
RESULTS.

The first series of experiments was conducted with rising concentrations of 5, 10, 15 and 20 per cent of NaCl. It was found that 5 per cent gave too low a yield and that 20 per cent did not give a yield sufficiently greater than that of 10 per cent and 15 per cent to justify the extra outlay of salt. The method of estimation of hypochlorite content is as follows :—

To 25 c.c. of the solution are added 15 c.c. of 10 per cent potassium iodide. This liberates free iodine which colours the liquid dark brown. A few drops of dilute HCl are then added and the resultant solution is titrated against 0.1 normal sodium thiosulphate (hypo). When the brown has changed to light yellow, indicating that the reaction is nearing completion, a few drops of starch solution are added and the black starch iodide so formed is an efficient indicator of the end point since the colour is totally discharged when neutralization of the iodine is complete.

The reactions involved are :—

- (a) The displacement of free iodine from KI by the available chlorine in the solution.
- (b) The interaction of hypo and free iodine :—



To calculate available chlorine :—

Let X = the number of c.c. of 0.1 N $\text{Na}_2\text{S}_2\text{O}_3$ required to neutralize 25 c.c. of hypochlorite solution.

Then

$$\frac{X}{25} \times 0.1 \times 35.5 = \text{grams/litre of available chlorine.}$$

e.g. :—

25 c.c. of hypochlorite solution + 15 c.c. of 10 per cent KI = 24.0 c.c. of 0.1 N $\text{Na}_2\text{S}_2\text{O}_3$.

Therefore the solution contains

$$\begin{aligned} \frac{24}{25} \times 0.1 \times 35.5 &= \text{grams/litre of chlorine.} \\ &= 3.408 \text{ grams/litre.} \\ &= 0.341 \text{ per cent chlorine.} \end{aligned}$$

To convert this figure into percentage of NaOCl the calculation is modified slightly.

$$\begin{aligned} \frac{24}{25} \times 0.1 \times 74.5 &= 7.15 \text{ grams NaOCl/litre.} \\ &= 0.715 \text{ per cent NaOCl.} \end{aligned}$$

The actual figures obtained are tabulated below.

TABLE I.

Percentage of salt solution used	Commen- cing Temp. °F.	Temp. at Elec- trolysis °F.	Current in amperes	Percentage yield at 1st analysis		Percentage yield at 2nd analysis		As Hypo- chlorite	Interval days	As Chlorine	As Hypo- chlorite	Fractional Deteriora- tion	Average daily Deteriora- tion
				As Chlorine	As Sodium Hypo- chlorite								
Atmospheric Temperature 60°-70° F.	1st Series	5	4.2	0.06	0.13	Not performed							
		10	4.6	0.14	0.31	"							
		15	4.9	0.14	0.31	"							
		20	6.5	0.16	0.35	"							
	2nd Series	88	5.2	0.20	0.42	75 d's.	0.17	0.36	15%	0.42	0.92	2.2%	0.105%
		100	8.8	0.15	0.30	Not performed							
		113	4.9	0.45	0.95	21 d's.	0.44	0.46	39%	0.22	0.46	23.3%	0.22%
		122	8.25	0.36	0.74	18 d's.	0.23	0.48	23.6%	0.23	0.89	2.5%	0.41%
		113	8.0	0.30	0.63	14 d's.	0.42						
		100	7.8	0.55	1.2	58 d's.							
		100	8.7	0.48	1.01	Not performed							
		113	8.7	0.53	1.12	"							
Atmospheric Temperature 75°-90° F.	2nd Series	122	9.2	0.32	0.66	"							
		100	8.0	0.21	0.45	"							
		113	7.0	0.35	0.75	"							
		122	8.2	0.47	1.0	31 d's.	0.20	0.42	57.4%	0.20	0.42	1.85%	
	3rd Series	100	8.7	0.39	0.82	Not performed							
		113	8.2	0.37	0.78	7 d's.	0.29	0.62	21.6%	0.29	0.62	3.1%	
		120	9.0	0.25	0.52	3 d's.	0.20	0.43	20.0%	0.20	0.43	6.6%	
		113	8.2	0.29	0.62	"	0.22	0.46	24.0%	0.22	0.46	8.0%	
		126	8.8	0.43	0.89	"	0.36	0.76	16.3%	0.36	0.76	5.4%	
		100	9.4	0.40	0.84	"	0.39	0.82	2.5%	0.39	0.82	0.83%	
		113	8.8	0.47	1.0	"	0.37	0.77	21.2%	0.37	0.77	7.06%	
		122	8.8										

Battery : 6 volt, 125 ampere hours. Amount of saline : 2 gallons. Time of electrolysis : 5 hours.

EVALUATION OF RESULTS.

A glance at the above table will show two outstanding features:—

(i) A considerable variation in yields ; (ii) a wide variation in deterioration rates.

The investigation of the causes of these variations necessitates the consideration of several variable factors involved in the production of the solution.

Temperature.—It is pointed out by most textbooks that the yield of hypochlorite increases up to 77° F. after which it decreases, with the subsequent formation of higher percentages of the chlorate and perchlorate. It was considered, therefore, that a fair assessment of the effect of temperature variation could be obtained by using (a) a starting temperature of between 60° and 70° F. ; (b) (in the second series) temperatures of 100°, 113° and 122° F., the concentrations used to be 10 per cent and 15 per cent.

In no cases was it attempted to produce increments in yield by altering either the voltage (and therefore current) or the time of electrolysis. It cannot, therefore, be denied that carrying the electrolysis nearer to completion for, say, twenty-four or even thirty-six hours at room temperature or the utilization of 12 instead of 6 volts for the same time may produce better results than those tabulated. Either factor, however, immediately introduces added difficulties—the necessary extra supervision and the extra battery—each a possible source of trouble to the M.O. The temptation to include this aspect was therefore resisted for the time being although, for use in larger formations such as hospitals and C.C.S.s, there seems no reason why further experiments should not be conducted on these lines. With the higher starting temperatures the current—an important deciding factor in the amount of chlorine liberated—was much higher. Although a more rapid breakdown of hypochlorite was expected this was not found in practice so excessive as to be uneconomical and it was finally decided that, for the purposes required, it was in fact more suitable to use a temperature of 100° F.

The atmospheric temperature was found to exert a marked influence. The reaction is exothermic. When the atmospheric temperature is between 60° and 70° F. and the commencing temperature of the solution is 100° to 122° F there is (roughly) a balance set up between heat gained and heat lost and yields are good. When, however, the atmospheric temperature rises above 75° F. (see table) the heat accumulates and the solution temperature rises excessively. This diminishes the yield. It is recommended, therefore that, under the latter conditions, the preparation be commenced at room temperature.

It is also found that, when the higher atmospheric temperatures are encountered, the stability of the hypochlorite is impaired so that deterioration is usually more rapid. It is not known exactly how much this is due to the rise in temperature of the solution during the experiment and to what extent it is due to the alterations of pH ; the latter is important but, since it was not possible to estimate it during the course of the investigation, the relation of pH alteration to temperature rise was not determined.

On the other hand, a reference to sample (5) in the table shows that the minute deterioration on an average of 2 per cent daily over a period of seventy-five days bears no relation to the variation in atmospheric temperature, since this sample was kept from February to May, 1943. It does emerge, however, that the stability of samples prepared during the cool season very markedly exceeds that of those prepared during the warm season and this is an important point to be considered with regard to storage. The presence of traces of magnesium salts in the solution has also a stabilizing effect. A more complete investigation on these lines will be carried out later.

Current.—Diminution in current by 50 per cent caused a diminution in yield of 66 per cent (approx.) for a similar atmospheric temperature. The factors of importance in this respect are :—

(i) The efficiency of the electrical connections with the liability of the chlorine-saturated spray from the solution to attack the metal of the electrodes. It was found that careful cleaning of the latter was necessary at the commencement of each experiment. A further

useful precaution is to smear a small quantity of vaseline over the outside of the terminal once the connexions are completed.

(ii) The diameter of the anode. After 20 gallons of solution have been electrolysed the diameter of the anode is about $\frac{1}{4}$ inch. This decrease in area of electrical surface exposed reduces the current very considerably and necessitates renewal of the anode. It has been suggested that a non-corrodable stainless steel electrode might be utilized as an anode but this has not yet been tried; in any case, since the carbons cost nothing, it seems a needless expense.

PREPARING THE SOLUTION FOR USE AND ITS STORAGE.

After the completion of electrolysis rough filtration through cotton wool is all that is necessary. Light hastens deterioration and the hypochlorite should be stored in clear bottles in a dark cupboard or in brown glass bottles or store jars in daylight. Since it is not expected that M.O.s will prepare more than is necessary for a week or so the question of storage is not of paramount importance.

USES OF HYPOCHLORITE.

It is to be emphasized that the finished product consists of a solution of sodium hypochlorite and hypertonic saline. Furthermore, the reagent must not be confused with the various chemically prepared hypochlorite solutions such as Eusol, Dakin's solution, etc., which differ from it in the following respects:—

- (a) They contain large quantities of alkali and have an irritant action.
- (b) They are most unstable and it is impossible to predict the hypochlorite content in any given sample within quite wide limits.
- (c) They are incidentally much more expensive to prepare.

The variety of uses to which the solution may be turned are exemplified below:—

(1) It is of great value in both the prophylactic and therapeutic treatment of wounds. The maximum permissible percentage of sodium hypochlorite for the actual continued treatment of open wounds is 0.2 per cent; higher concentrations are irritant. It will thus be seen that a standard of dilution of 1 : 5 conforms sufficiently accurately with this requirement. For the immediate treatment of foul smelling wounds or grossly contaminated, fresh wounds it may be used for a limited time at full strength. Burns respond extremely well to irrigation with the diluted solution.

(2) General disinfection, e.g. sterilization of water supplies, eating utensils, glassware and rubber instruments. The Cookhouse and N.A.A.F.I. of the camp where the writer is quartered draw a regular ration of hypochlorite which is used to sterilize the men's eating utensils and drinking glasses after use.

When it is proposed to sterilize water the routine Horrocks' test must first be carried out substituting drops of full strength hypochlorite for the W.S.P. solution. The number of the cup which first exhibits a blue colour on the addition of starch cadmium iodide indicator is multiplied by three to give the number of drops of hypochlorite required to sterilize one pint of water.

(3) Blood clot is dissolved by hypochlorite. The solution is utilized in the cleansing of blood transfusion apparatus.

(4) As a deodorant and for air sterilization it is very valuable. For this purpose it is used in the form of an air spray around and on the bandages of foul wounds.

(5) Dysidrosis and athlete's foot, so common in the tropics and sub-tropics during the summer months, are markedly improved by footbaths of a 1 : 20 dilution.

Although it has been pointed out that for continued use on wounds the solution should not be employed in a stronger concentration than 1 : 5, the limits imposed on dilution are considerably more elastic. It has been used with success in as high a dilution as 1 : 50. For wounds, however, the dilution should not be so great as to render the residual saline (about

13.5 per cent) hypertonic ; for this type of therapy, therefore, it is never diluted more than 1 : 10, thus maintaining a hypertonic saline solution throughout.

There are almost no antiseptic uses in hospital or M.I. Room work where hypochlorite cannot be utilized whereas many antiseptics available under Service conditions (especially the cresols) are quite unsuitable for the purposes for which hypochlorite is employed. It has occurred to the writer that a considerable saving in shipping space and expense could be effected by the widespread adoption of a method such as that outlined above so that an antiseptic may be prepared in the place where it is required.

SUMMARY.

- (1) A method of electrical preparation of sodium hypochlorite suitable for active service conditions is described.
- (2) The mode of analysis is outlined and results tabulated.
- (3) Effects are shown of variation in current, temperature and size of electrodes.
- (4) The uses of hypochlorite are discussed.

I am greatly indebted to Dr. Wadie Tedros of the Faculty of Chemistry, Fuad I. University, for his helpful suggestions and assistance in the many analyses necessary ; to Major Pulvertaft, R.A.M.C., for constructive criticism of the text and to my M.I. Room staff for their collaboration in the preparation of samples.

REFLECTIONS OF A FORMER MILITARY REGISTRAR.

BY MAJOR-GENERAL R. J. BLACKHAM, *C.B., C.M.G., C.I.E., D.S.O.*

THE following "talk" was given at the R.A.M.C. Record Office at a Course arranged for Military Registrars by Colonel Knott, the Officer in Charge of Records.

It followed an address by Lieutenant-Colonel J. T. Robinson, at that time A.D.G. A.M.D.1, at the War Office, entitled "A Survey of the Responsibilities of E.M.S. Non-medical Registrars and changes effected by them since their appointment was authorized."

In this address the organization of the E.M.S. was sketched and it was pointed out that in 1940, soldiers were being retained at these hospitals with minor disabilities for long periods as civilian doctors did not realize that their primary duty in connexion with Service personnel was to get men fit quickly and return them to their units at the earliest possible moment. There were also innumerable complaints from Service patients about pay, allowances, clothing and equipment which obviously could not be overcome and dealt with by the civilian staffs of these hospitals. Many soldiers admitted to E.M.S. hospitals were lost to the Army for months and Record Offices had great difficulty in tracing men owing to the inexperience and misunderstanding of civilian staffs in some of these hospitals in being unable to appreciate the value and the necessity of Army Forms and records being maintained. Many of these civilian officials were in fact ignorant of what records were required. A further difficulty which confronted these hospitals and was of paramount importance to the morale of the Army was the difficulty and delay experienced in "boarding" Service personnel and disposing of them on completion of their hospital treatment.

The E.M.S. quickly realized that military medical officers were required. They were required for three purposes, first to deal with the question of Medical Boarding of all casualties and to assist the civilian doctors in the necessary procedure and care which was required in the completion of the various invaliding documents; secondly, to arrange for the disposal of military patients after hospital treatment and, thirdly, to relieve the administrative staff of hospitals of innumerable problems in connexion with pay, equipment and discipline. The E.M.S. requested the War Office to post medical officers to all hospitals which were taking convoys and medical officers of special experience were selected for these appointments and were sent to each hospital.

I had the good fortune to be one of these officers and was soon to find that, although the E.M.S. authorities certainly realized that military M.O.s were required in the E.M.S. hospitals and had come to an agreement with the War Office as to what accommodation was required for these officers and their staffs, the individual hospitals at the outset did nothing whatever to prepare for the military M.O.s who were being attached to the hospitals under their control.

The hospitals receiving military patients were organized on the basis of having a military wing of 300 beds. The figure of 300 was arrived at as this represented the number which would be carried in an ordinary convoy. It was before the fall of France when the convoys were beginning to arrive and the War Office was anxious to get as many military wings as possible functioning. The result was that I was appointed on a Wednesday, reported for instruction at a certain hospital on Thursday, was asked on Friday if I was ready for posting and was actually posted on Saturday.

I went down to an important county town and was attached to a former county voluntary hospital of about one hundred beds. It had been up-graded by the Ministry of Health building five of its standard huts in the hospital garden. Each of these huts was prepared for forty-two patients; so these new huts added 210 to the hundred or so beds which were available in the hospital itself. It could have taken in a convoy at a pinch by sending all the civil patients in the main building, who could be evacuated, to their homes in taxis.

I have heard grumbles from some military registrars with regard to staff so the reader

may be interested to know that when I arrived I found a N.C.O. in the uniform of a staff serjeant of the R.A.M.C. and two orderlies. I may mention that the "staff serjeant" was a mental nursing orderly who had managed to reach the rank of corporal but, although he was a regular, he had never been employed outside a mental ward! Military regulations—other than those in connexion with the insane—were to him an uncharted sea and he had a most abysmal ignorance of all Army books and forms. He had not the faintest idea how to write the simplest memorandum.

I was received very courteously by the secretary of the hospital—a gentleman who had quite recently taken office—and as it was a voluntary institution I had no medical superintendent to appeal to.

The first few days I camped out on a table in the secretary's office. I then persuaded the resident medical staff to give up one of the two rooms they were utilizing and that was converted into something resembling an office.

Meantime, I had found a large bicycle shed in the hospital grounds which was not weather-proof but there was nowhere else where any sort of suitable accommodation was available. I got in touch with the chairman of the Board of Governors and he managed to get the shed made waterproof and reconstructed so that after about a month I had quite a fair office and a good-sized room for the clerks. The chairman bought furniture at various second-hand shops and the resident medical staff gave me some of theirs so the building was quite well furnished.

With reference to a pack store and linen (or clothing) store the secretary assured me he had nothing to offer; but I found a potato shed in the garden which, by means of handymen, was converted into quite a reasonable pack store and I discovered an old splint store full of rubbish of various kinds which I persuaded the senior surgeon to hand over and, with the aid of shelves, it made quite a handy clothing store. Compared with some places I was not too badly off as a large E.M.S. Hospital near London had no pack store and no blue clothing in May, 1940.

There was of course no imprest account and the paymaster was somewhat reluctant to open one; and, for the first fortnight or three weeks, I paid the patients and furnished the necessary money for stamps, etc., out of my personal pocket.

Some six months later I was transferred to a hospital in another district where I found the conditions which had been accepted by my predecessor for office and stores deplorable. I succeeded in getting these improved and my successors are now enjoying the fruits of my labours.

I mention these personal experiences as they may be of some historical interest with reference to the difficulties in getting new medical organizations started.

Soon I had officers posted to me for training and, having suffered from a sad lack of training myself, I put together the little book—"Notes for the Guidance of Military Registrars at E.M.S. Hospitals." I did this to give my pupils something to work on as they were middle-aged men from general practice who had no recent military experience.

This book is now three years old and, in the change and stress of war, its contents have been subjected to heavy amendments. Modified and corrected up to date, as all official books must be, I hope it is still of some use.

When I was appointed in 1940 the complaints from Service patients in civilian hospitals with regard to pay, allowances, clothing and equipment were at their highest and it was with some trepidation that some of us undertook the duties, practically all of which still appertain to the important office of military registrar, viz. :—

(1) O.C. of a mixed detachment consisting of R.A.M.C. and men from other regiments and corps for police duties;

(2) O.C. of military patients in the hospital to which the registrar was attached. This was soon expanded by a War Office telegram which instructed military registrars to assist medical superintendents in neighbouring hospitals;

(3) Paymaster to military patients in hospitals;

- (4) Quartermaster in charge of clothing and equipment ;
- (5) Welfare Officer for patients in hospital ;
- (6) Member, and often president, of medical boards ;
- (7) Liaison Officer between the military authorities and the medical superintendent.

I have placed the most important of these duties last on the list, viz. Liaison Officer, but I will refer to it first.

I do not propose to refer to the duties of O.C. detachment, paymaster or quartermaster ; but I submit that, however efficient the registrar may be with regard to these " merely military matters," he will entirely fail in his responsible office if he does not maintain close liaison with his medical superintendent, his Sector hospital officer, if in London, his hospital officer elsewhere and last, but not least, the various medical officers with whom he comes in contact. These gentlemen are willing to meet him half-way. They are all full of medical and surgical lore but they lack the military knowledge which the military registrar " enjoys." They appreciate their limitations and most medical superintendents are anxious that the discipline of the military patients in their hospitals should be kept up to the mark ; indeed, since I have ceased to be a registrar myself, I have actually been approached by medical superintendents who desired to improve the discipline of their hospitals.

This matter is closely connected with one of the chief criticisms of the E.M.S., viz. that soldiers are retained at these hospitals with minor disabilities for long periods as civilian doctors often fail to realize that their primary duty in connexion with Service personnel is to get men fit quickly and return them to their units at the earliest possible moment.

This is a matter in which the military registrars can render yeoman service. The medical superintendents have no desire to have their beds occupied by trivial cases and military registrars can help by suggesting to civilian medical officers that their relation to Service sick and injured is quite different from their relation with civilian patients.

E.M.S. medical officers are very fond of talking of Service men as " their patients." The registrar can point out to them that Service sick are *not* their patients but patients of the State and their first duty is, therefore, to their country who pays them to look after its soldiers, sailors and airmen and trusts them to return them to duty at the earliest possible moment.

But there is another class of case, dealt with in A.C.I. 2612/42, which is far from trivial.

These are serious cases which are often retained in hospital far beyond the period laid down in the A.C.I.

The reader will say at once that E.M.S. hospitals are not bound by Army Council Instructions and he will be right ; but the War Office and the Ministry of Health get together over important matters of this kind with the result that the A.C.I. is backed up by an E.M.S. Instruction. In this case the E.M.S. Instruction is No. 272 and was signed by the Director-General of the E.M.S. on June 12, 1941.

This brings me to refer to these E.M.S. Instructions which are issued from the Ministry of Health and bear the same relation to the E.M.S. as our A.C.I.s do to the Army. These Instructions are not sent to military registrars but medical superintendents usually pass on to their registrars those which they think will be of interest to them. I submit that this is not satisfactory and when I was a military registrar I arranged that I should see all E.M.S. Instructions and I made copies of those which were of interest to me as a military registrar.

Registrars, of course, realize that administrative officers of the Fighting Services have no right of entry into E.M.S. hospitals and must give medical superintendents notice when they desire to visit them but registrars are the eyes and ears of the A.D.M.S. and D.D.M.S. in any particular group of hospitals.

Here again registrars are aided by an E.M.S. Instruction, E.M.S.I. 305 dated July 15, 1941, paras. 4 and 5, which lays down that " In order to reduce the possibility of military patients being overlooked whose prospects of becoming fit for military service are remote, the Inspectors of Medical Services, Military Consultants and Presidents of Medical Boards

will be given full facilities for investigating such cases and for advising on the action to be taken."

D.Ds.M.S. are kept in touch with all patients who have been in hospital more than four weeks by a nominal roll which is sent them monthly, known as E.M.S. 149.

The procedure, adopted in the Commands in which I am now serving and previously served, has been to send me these E.M.S. 149 monthly and leave me to visit the medical superintendents of hospitals with reference to cases which have been in hospital beyond the limits of A.C.I. 2612/42.

Without exception I have found medical superintendents anxious and willing to help as they quite see that a soldier who is not likely to be fit for service in nine months should make way for another man. They realize that men in hospital are still on the strength of the Army and it is not fair to the Adjutant-General to keep men on his strength who are not likely to be any use to him within nine months.

Our hands in this matter have been greatly strengthened by A.C.I. No. 2022 of September 23, 1942, which creates Emergency Service Hospitals to which it is intended that all Service cases should be transferred.

Nothing is more pernicious than the system by which Service cases are dotted about in small—or even large—civilian hospitals in small numbers. Nothing could be worse for discipline or morale as the patients are apt to become spoiled "Boys in Blue" with no desire to return to their units. The medical superintendents do not want these laddies but the nurses *do* and will hold on to them like grim death.

Tact and diplomacy on the registrar's part will overcome difficulties in this particular. It is greatly in their own interests to get these small groups of cases transferred to the Service Hospitals so that the registrar can effectively function in the next role to which I shall refer, namely, his position as Welfare Officer to Service men in civil hospitals.

In Appendix I, para. 1, of my booklet (page 25) it states that the "military registrar will be responsible for the general military supervision of all soldiers in the civil hospitals of his group."

This paragraph was culled from the annexure to War Office Letter No. 79/Mob/3287 (A.G.1A), dated 15.11.39, which might be called the Charter of the military registrars as it was pretty well all we had to guide us in those early days of 1940. This annexure is of such interest that I append a copy of it.

Notes for Registrars (pages 14 and 15) emphasize their responsibilities for the general supervision of military patients in their hospitals. These paragraphs, it is suggested, constitute the registrars' military welfare officers' duties as they are instructed to see all patients at least once a week, apart from pay days, and do everything possible for their comfort.

This indeed is one of their most important functions. They are each the one bright—or should I say brown—spot of khaki in their group of hospitals and they can do a great deal to keep up the morale of the men by talking to them and taking an interest in them and their families individually.

There can be no sort of doubt that the early successes of the German Army were due to the close relationship between the officers and their men.

The Kaiser relied on his Prussian officer caste. Hitler has relied on his army as a whole. The German officers eat, sleep and work in the closest contact with their men and are, I am credibly informed, even the confidants of their men in their domestic affairs.

In fact the German officer of to-day—far from being the bully we used to hear about in the last war—is the Big Brother of his men.

I should like to see the military registrar more in the role of Big Brother to the officers and other ranks in the E.M.S. hospitals of their groups.

I suggest that they should organize military lectures and talks on the War. There is far too much "sob stuff" in some of the Home Hospitals. The men in the Home Hospitals are not always war worn soldiers but often youngsters who have never heard a shot fired and are suffering from an interruption in their military training.

COMMUNICATIONS.

Facility for rapid communication with the world outside his hospital is vital to the work of the military registrar and, on page 3 of "Notes for the Guidance of Military Registrars at E.M.S. Hospitals," it states that the military registrar should be provided with a telephone.

I am afraid this is a bit vague and not quite what was intended by the writer who insisted that a separate telephone, direct to the local exchange and independent of the hospital system, should be provided. This was agreed to and provided but, in some cases recently, this telephone has been withdrawn as an economy with the result that in one large hospital it is difficult to get through to the registrar and would be impossible if the "Blitz" started again. The registrar should have his own direct line and it should be possible to convince medical superintendents of this. I suggest the final decision on a point of this kind should not rest with individual hospital authorities as it is a matter of policy affecting Service patients in civil hospitals.

At the end of 1940 the Government decided that, owing to the heavy calls on the medical profession for the Fighting Services, there was a danger that the civil population might be deprived of adequate medical services and the morale of the country might suffer. A Government Committee called the Robinson Committee was set up and, amongst its recommendations, advised that the duties of military registrars could be carried out by non-medical officers of low medical categories. The Medical Department accepted this recommendation, and A.G. 12 (f) supplied suitable officers to replace the R.A.M.C. registrars. The writer submitted a syllabus for training of the new non-medical registrars and all military registrar appointments have been in lay hands since 1941. To all intents and purposes, the non-medical military registrars carry out all the duties of their R.A.M.C. predecessors with the exception of sitting on Medical Boards.

MEDICAL BOARDS.

But, though they no longer sit as members, military medical boards loom very largely in the registrar's daily life as they are responsible for the preparation of certain parts of invaliding documents and for all non-medical matters in connexion with them.

In the first place, on the replacement of R.A.M.C. officers by non-medical military registrars, (1), the general supervision of the preparation of A.F.B. 179c and of Part III of A.F.B. 179, (2) the medical abstract of cases of officers for medical boards and (3) the signature of O.C. Hospital of Part III of A.F.B. 179, has devolved on medical superintendents, who detail an E.M.S. officer, usually their deputy, to supervise the work of individual medical officers. An experienced E.M.S. officer detailed by the medical superintendent has replaced the second R.A.M.C. officer hitherto essential for military medical boards.

He is often one of the deputy medical superintendents and he is usually the officer detailed by the medical superintendent to supervise the preparation of board documents.

Military registrars continue to be responsible for Parts I, II, and VI of A.F.B. 179.

Officers and nursing sisters must be boarded in accordance with A.C.I. 1002/41 if they are likely to be absent from duty for more than six weeks, otherwise they are boarded by order of the D.D.M.S. at the request of the War Office, when copies of previous medical boards are usually forwarded.

A.C.I. 1002/41 is more honoured in the breach than the observance as officers are constantly being brought before Medical Boards who have been three months and more in hospital without being boarded. Recently I came across a case of an officer who was in a civil hospital used as a hospital for officers from October to June without a board.

Here is a way in which the registrar can help.

As military Welfare Officer he should know when an officer is likely to be six weeks absent from duty and should call the attention of the medical superintendent to A.C.I. 1002/41 in the officer's own interest.

The registrar must insist that, when it is decided to bring an officer or other rank before a medical board, he should be informed at the earliest possible moment so that he can apply to the Officer i/c Records for any documents which may be necessary.

E.M.S. Instruction 305 dated 15.7.42—to which I have already referred—draws attention to the importance of completing A.F.A. 45 and A.F.B. 179 fully and accurately as otherwise the claim of an officer or man to a disability pension or gratuity may be prejudiced.

Accidents and Injuries.—In all cases of accident and injury to officers and other ranks the military registrar will apply for A.F.B. 117 and A.F.A. 2 (Court of Enquiry proceedings).

Military registrars, in the interest of the officer or soldier, will apply for these documents when from the gravity of the officer's or soldier's injury there is any likelihood of the officer or soldier being brought before a board. They should not wait till it has been decided to board them as this may cause delay and keep the officer or other rank in hospital longer than necessary.

Officers' boards give registrars a good deal of work as all instructions from the War Office with reference to these boards pass through them. Medical Officers in E.M.S. Hospitals who fully understand that Part III of A.F.B. 179 has to be completed by them will send up officers and nursing sisters without any similar special notes for the guidance of the medical board, in complete disregard of E.M.S. Instruction 305, which states clearly that they will attach a concise abstract of the same preliminary reports which have to be submitted with regard to other ranks.

Paras. 1-6 of A.F.A. 45 should be completed in the registrar's office and the abstract of the case (referred to in E.M.S.I. 305) should be submitted in a form which can be forwarded with A.F.A. 45. If this abstract is not signed by a specialist a separate specialist's report will usually be required.

The original completed copy of A.F.A. 45 is sent by the registrar with a letter signed by the President in accordance with the *pro forma* detailed in W.O.L. No. P/22190/6 (A.M.D. 10) dated 22.9.42 to the Under-Secretary of State, The War Office, as stated in W.O.L. No. A.M.D. 2/Stats/464 of 30.7.42.

All other ranks must be brought before a board after five months in hospital, *vide* A.C.I. 2612/42 and E.M.S. Instructions.

This is another A.C.I. which is more honoured in the breach than the observance and here, too, the registrar can help by reminding the medical superintendent of patients over five months in hospital.

I find it satisfactory to have the military registrar's board clerk present at boards. By this plan A.F.B. 179 is under the registrar's control and his clerk can see that all necessary signatures are completed and the instructions of War Office Letter B.M. 47 (A.M.D. 10) dated 22.1.42—that all signatures should be printed in block letters as well as the ordinary signature—complied with. This American practice is very necessary as so many doctors' signatures are as illegible as their prescriptions.

Registrars should always notify presidents of boards of the number of cases they propose to bring before them so that the Presidents can allot sufficient time for completion of the boards.

An old Form has recently been reprinted and has been adapted to a new purpose.

Part I of A.F.B. 3978 has to be completed for all cases placed in Category "E" and forwarded together with discharge documents to the Officer i/c Records concerned who will check the statements thereon and then dispatch it to the Under-Secretary of State, the War Office (A.M.D. 2/Stats). If, however, the medical board consider that a serious error in grading was made by the civilian medical board who examined the soldier before enlistment, Part II will be completed and a further two copies forwarded to the Under-Secretary of State, the War Office (A.M.D. 5).

Ministry of Pensions Form M.P.M.S.D. 299 must also be completed for all cases when they require further treatment and should be signed by the medical officer in charge of the case or by the president of the board and—when countersigned by the military registrar—forwarded to the Ministry of Pensions.

May I summarize these notes of the military registrar's duties with regard to medical boards :—

of the medical service by getting better pay and pensions for Army surgeons, and by some means he infused his own spirit into the corps so that the medical officers, in intervals of peace, went and improved themselves in their knowledge of their profession.

While M.O. to the Connaught Rangers, McGrigor had been involved in several disputes with its Colonel, afterwards Marshal Beresford, the man who so nearly lost the Battle of Albuera. Beresford had the worst of the exchanges and became the firm friend of the doctor. Something the same, on a bigger and more influential scale, happened with Wellington. In 1805 McGrigor was promoted a deputy inspector of hospitals. He had the handling of the sick and wounded who were disembarked at Portsmouth from Sir John Moore's army after Corunna and during the disastrous Walchaeren expedition. His masterly improvisation and organization gave him a standing which was of the utmost help to him. He cleaned up the administration of the medical services in Portugal. Wellington objected to some of his regimental and brigade arrangements—and those arrangements are substantially the ones now in operation in the Army. McGrigor thereupon set up a field hospital which overtook the enormous congestion of casualties by wounds and disease caused by the capture and sack of the fortress of Badajoz.

At long last Wellington permitted McGrigor to establish regimental hospitals but this point was gained only after a bit of a struggle. Wellington, himself a great organizer, could admire an organizer and McGrigor proved conclusively that he was as competent in his own line—in planning and foresight—as Wellington in his. After Salamanca McGrigor ordered up commissariat transport and supplies to cope with the sick and wounded. Summoned to the Commander-in-Chief's presence, he found Wellington having his portrait painted. McGrigor told him what he had done. The Duke—always touchy upon the subject of order—sprang up and talked very violently, "I shall be glad to know who is to command the Army, I or you?" However, an Aberdonian then was not easily intimidated. Very soon afterwards, when the British had to retreat from Burgos, Wellington was anxious not to leave the hospitals to their fate. McGrigor, however, despite his recent dressing-down, had already commandeered all the empty ration and ammunition carts and sent off all his casualties in them in good time to the rear. The result was that Wellington could withdraw his army without being hampered by hospital cases and with the roads clear behind him. He congratulated McGrigor who, greatly daring, recalled the Duke's recent reprimand and said the action for which he had reproved him had justified itself. "It is all right as it has turned out," said Wellington, "but I recommend you to have my orders for what you do." But thereafter it was Wellington who did everything McGrigor asked, not the other way about and at Vittoria McGrigor repaid him by having 5,000 convalescents fit for service whose return to active duty had not been expected.

Here, now, is a curious coincidence. At one end of Europe the Director of Medical Services in the Army opposing Napoleon's was James McGrigor, M.D., of Marischal College, Aberdeen, who, between the battles of Salamanca and Vittoria, had put 93,000 sick and wounded through his hospitals. At the other end of the Continent where the Russian Army confronted Napoleon, the Director of the Tsar's army medical service was John Wylie, M.D., of King's College, Aberdeen's other University, who is credited with having performed over 200 operations at the Battle of Boredino alone.

Now having heard all this, you will have, I've no doubt, a big question mark in your mind. Why should a couple of unknowns from far Aberdeen have made such a reputation in medicine? Well, their medical pioneering was quite in keeping with an ancient and long-sustained Aberdeen tradition of being first in medical matters. But first of all, I should tell you that sometimes it is a little difficult to understand how Aberdonians in those days became doctors at all. McGrigor was educated at Marischal, the "toun's collidge" of Aberdeen, and in respect of medicine as easy going as the elder and rival University of King's. Thus McGrigor's Professor of Medicine combined lectures on that subject for many years with the hardly cognate characters of Oriental languages. That was not quite so bad as the worst spell at King's when two Bannermans, father and son, from 1793 to 1838, held the Chair of Medicine and never delivered

a lecture. It was the elder Bannerman's nephew, Sir Alexander, by the way, who became Governor of Newfoundland and, incidentally, was the husband of Margaret Gordon, the first sweetheart of Thomas Carlyle. Yet in those days Aberdeen turned out doctors who, for their time, were as progressive as they are now. To return to our Aberdeen medical tradition. In 1493 Aberdeen passed a regulation—the first of its kind in Britain—for the control of venereal disease—it runs this way. "The alderman and council statut and ordanit for the eschevin of the infirmitez comin out of France and strange partis" certain rules which need not here be recapitulated. Though in McGrigor's time both colleges were slack in their attention to medical teaching, they could at least crow over all other universities in the land in some respects. King's College, founded on the model of the University of Paris in 1495, had a Professor of Medicine or Mediciner from the outset. It was not until 1540 that Cambridge had a medical chair and Oxford followed six years later. So Aberdeen was half a century ahead. Then, of course, medicine was just a subject in the ordinary course of general study. Not till 1654 did King's confer its first degree of Doctor of Medicine, and the recipient, John Glover, was described as of London, and was by some curious chance a B.A. of Harvard University. Before that time, the mediciner had petitioned the Privy Council in vain for the bodies of "executed malefactors, rebels and outlaws," to practise anatomy on. Before that time, too, three men had passed through one or the other of Aberdeen's Universities, taken their medical degree elsewhere, and become physicians to the King. Alexander Reid and Arthur Johnston were physicians to Charles I and Robert Morrison to Charles II. Reid's brother was Latin Secretary to James I and, in that way, came to present his alma mater with an unusual gift—a bundle of books belonging to the library of St. Paul's Cathedral, which the King had borrowed and forgotten to return—he was good at that. But if King Jamie had been quite honest and sent them back they would have been destroyed in the Great Fire of London. As it is, they and one other volume are the only ones remaining of the original library of St. Paul's Cathedral. However, that's by the way.

In the history of medicine, McGrigor deserves a place beside two other celebrated Aberdonian doctors—George Cheyne, London's fashionable physician in Queen Anne's day, who introduced dietetics to the notice of the public and inaugurated the first wave of nutritional fervour of which we are to-day experiencing the fourth tide; and Sir Patrick Manson, whose researches led directly to the discovery of the mosquito's part in the spread of malaria and so made possible a great advance in the civilization of the tropics.

But now to come back to my portrait—after the Peninsula War McGrigor was knighted and later got a baronetcy. He became Director-General of the Army Medical Department and remained at his post until 1850, about eight years before his death. He went to the Hunterian School to study anatomy and chemistry. He established insurance and benevolent funds for medical officers. He built up a military surgical museum, which at his retirement contained among other things nearly 6,000 specimens in natural, morbid and comparative anatomy, and a regular golgotha of skulls—over 500 human crania. To the library he gave 1,500 volumes besides begging nearly 9,000 more from his friends.

All this, you may say, is a pretty long way from the up-to-date R.A.M.C. of our own times. Since McGrigor's death in 1858 medicine has changed out of all recognition. Anæsthetics, marvellous curative drugs, the most delicate instruments, the motor car, the aeroplane, have revolutionized the medical side of warfare. Disease, which used to be as deadly as wounds, to-day claims a trivial number of victims, and wounds themselves, which meant death or complete disablement in nearly 50 per cent of cases in McGrigor's time, are now so promptly and effectively handled that the proportion of those who die after admission to hospital is quite incredibly low. Yet all things must have a beginning and, if McGrigor hadn't brought his genius for organization into the service, military medicine might not to-day have been in so satisfactory a condition. Even his experiments in hospital arrangement and management and in the transport of casualties, crude as they were by modern standards, helped to define the right road to efficiency which the Royal Army Medical Corps to-day faithfully follows.

Officers and Nursing Sisters.—(1) Complete A.F.A. 45, paras. 1-6; or A.F.A. 45C for officers to be upgraded or retained in their present category, provided they have been previously boarded on account of their present disability.

(2) Obtain abstract of case from specialist for guidance of the board.

(3) See that all officers placed in Category "C" receive A.F.B. 196.

(4) Check original A.F.A. 45 and forward it to the War Office.

Other Ranks.—(1) Prepare A.F.B. 179, Parts I and II. Part II should be witnessed by the registrar's board clerk or someone who, in the soldier's interest, can explain to him the importance of the opportunity given him to make his own statement with regard to his illness or injury. The Ministry of Pensions scrutinize these parts of A.F.B. 179 very closely yet military registrars send these documents up with Part II prepared anyhow and often witnessed by a nurse!

(2) Call the attention of young E.M.S. officers to E.M.S.I. 305 which clearly states the reports they must obtain before completing Part III.

(3) After the board, if the president has completed Part V, carry out the man's discharge except in the case of men with amputations. A.C.I. 991 dated 9.5.42—since cancelled by A.C.I. 750/43—introduced a new invaliding procedure with regard to amputation cases, other ranks.

The soldier is brought before a medical board as soon as the stump is quite healed and ready for fitting with an artificial limb. Part IV of A.F.B. 179 will include a statement in red ink that the soldier requires an artificial limb and that his discharge will *not* be carried out till the provisions of this A.C.I. are complied with. The soldier remains on indefinite leave until the Ministry of Pensions certify to the Officer i/c Records that an artificial limb has been satisfactorily fitted.

This A.C.I. contains a provision that, if his O.C. wishes to retain a limbless soldier, he will submit an application through O. i/c Records to the War Office (A.M.D. 10) certifying his willingness to retain the limbless soldier and stating what duties he will be required to perform and his qualifications for those duties. If it is decided by the War Office to retain the soldier, the O. i/c Records notifies the Ministry of Pensions and his discharge is not carried out. A.C.I. 1823 amends A.C.I. 991 for soldiers who have been invalided from overseas or lost touch with their units. In such cases the board appends a certificate that the limbless soldier is capable of doing a full day's work in the Army if found suitable employment.

Regulations, Army Medical Services, lay down that proceedings of medical boards on both officers and soldiers are confidential. No information should be given to soldiers with regard to medical boards and officers should only be told the category in which they are placed and the period for which the board recommend that they should remain in that category.

Registrars must take steps that A.F.s A. 45, A. 45C and A.F.s B. 179 are *always* under the custody of a reliable N.C.O. or official. They should be kept under lock and key and never accessible to unauthorized persons.

Medical officers in E.M.S. Hospitals should have this matter especially brought to their notice and registrars should point out to them that the action of a medical board will be greatly prejudiced if they disclose to Service patients the recommendation they have made.

Here is a case in point. A medical officer told an A.T.S. private that he was recommending her discharge. Neither his medical superintendent, who is a physician of high standing, nor the medical board agreed with his opinion and the auxiliary was placed in Category "C."

The result of this medical officer's indiscretion was a letter from the War Office reporting a complaint from the girl's parents which placed additional correspondence on the military registrar of the group in which the hospital was included.

The work that military registrars are doing is of first-class importance to the country, the hospital authorities, the Services and, above all, to the individual fighting men who are casualties in civil hospitals.

In the writer's experience a large number of the regimental officers who have been posted as military registrars have adapted themselves admirably to their novel duties and are rendering yeoman services to officers and other ranks of all the Fighting Services in civil hospitals in all parts of the Kingdom.

*Annexure to War Office Letter
No. 79/Mob/3287 (A.G.1A)
dated 15th November, 1939.*

DUTIES OF THE REGISTRAR AND OFFICER COMMANDING DETACHMENT,
ROYAL ARMY MEDICAL CORPS, IN A MILITARY WING OF A CIVIL HOSPITAL.

(1) This officer will work in close liaison with the Medical Superintendent of the Civil Hospital and will be responsible for the general supervision of all military cases in the hospital.

(2) He will arrange for the regular payment of all military cases and for this purpose will become an imprest holder.

Separate instructions regarding this will be issued at any early date.

(3) He will ensure that no patient leaves the hospital unless in possession of a pass on which will be stated full particulars for which such permission is given. Leave to be absent from the hospital after 8 p.m. will only be given in exceptional circumstances.

(4) He will ensure that as soon as possible after admission all military patients are issued with hospital clothing on the scale laid down for patients in military hospitals for which purpose a stock of hospital clothing will be maintained on ledger charge.

(5) As soon as patients are issued with hospital clothing he will arrange for their Service clothing to be handed in to the pack store and for necessary articles to be sent to the laundry.

(6) He will ensure that equipment and clothing ledgers are correctly maintained and will inspect the ledgers and check the stuff at the end of each month.

(7) He will be responsible for the safe custody of patients' valuables and for this purpose will be issued with a safe. Patients will be instructed that valuables which they retain in their possession will be at their own risk.

(8) He will be responsible for the preparation and maintenance of hospital and other records of all military cases and will render such returns as may be considered necessary by the D.D.M.S. of the command in which the hospital is situated.

(9) He will arrange, in conjunction with the Medical Superintendent of the hospital, for the preparation of Army Form B 179 for all cases whom it is proposed to bring before a medical board with a view to determining their fitness or otherwise for continuance in the Service. All applications for medical boards to be held will be submitted to D.D.M.S. of the command in which the hospital is situated.

(10) He will issue Railway Warrants for authorized journeys to men on their discharge from hospital and, for this purpose, will be issued with the necessary books of Railway Warrants which will be kept under lock and key.

(11) He will be responsible for the investigation of disciplinary charges which may be brought against any of the patients, which will be dealt with in accordance with paragraph 1388, King's Regulations, 1935.

(12) He will issue standing orders for the Military Wing of the Civil Hospital.

(13) He will perform the duties of Officer Commanding Detachment, Royal Army Medical Corps, etc., *vide* Standing Orders, Royal Army Medical Corps, etc., 1937, Section V.

CLINICAL ASPECTS OF NEOPLASM OF THE TESTIS, AND CASE REPORTS.

By MAJOR H. S. SHUCKSMITH, F.R.C.S.,

Royal Army Medical Corps,

AND

CAPTAIN G. K. HARRISON, F.R.C.S.,

Royal Army Medical Corps.

Six cases of neoplasm of the testis, a condition sufficiently rare to present difficulties in diagnosis, have been encountered in a short time. This series furnishes many interesting features which are described more from the clinical than the pathological aspect.

Case 1.—Fusilier, aged 22.

This patient noticed increase in size, and only occasionally a dull ache, in the right testis over a period of eight weeks. The testis was the size of a duck's egg with a smooth surface, solid consistency and it was heavy. Specific testicular pain was present though diminished. The cord was not thickened. There was no clinical or radiological evidence of metastases. The cord was divided after traction at the internal abdominal ring and orchidectomy completed (H. S. S.). The tissue bulged out of the tunica when the testis was cut and it looked like normal testicular tissue although the organ was enlarged three or four times. There were one or two small areas of degeneration visible in the cut surface. Histology showed the homogenous appearance of a seminoma throughout the specimen.

Case 2.—Lieutenant, aged 25.

This patient noticed increase in size of the left testis for only two weeks and experienced no pain. There was a swelling the size of a bantam's egg in the region of the globus major, of irregular surface, craggy consistency and extending upward to the thickened cord. There was no clinical or radiological evidence of metastases. The testis was explored and orchidectomy performed, the cord being divided at the external abdominal ring (W. E. M. M.). The tunica albuginea and epididymis around the sinus pularis were normal in appearance. On section a mass of grey tissue was seen involving the rete testis and extending upwards medial to the globus major and forwards slightly into the upper pole of the testis. The major part of the testis was normal. Histology revealed an adenocarcinoma of a highly malignant type and the vas was involved.

Case 3.—Private, aged 20.

This patient was seen by one of us (H. S. S.) with a solid swelling of the left testis, the size of a goose's egg with smooth surface and solid consistency. It was heavy and specific testicular sensation was absent. There was no clinical or radiological evidence of metastases. The previous history, extending over a period of weeks, was of swelling of the testis following trauma. Two aspirations had been performed, withdrawing apparently normal blood. Orchidectomy was performed (H. S. S.) and the testis on section showed complete replacement by hæmorrhagic and degenerated growth. Histology showed the typical appearance of a seminoma.

Case 4.—Gunner, aged 30.

This patient had a symptomless swelling of the right testis, present for five years. It was the size of an orange with nodular surface and stony hard consistency. Specific testicular sensation was absent. The epididymis was not palpable and the cord was slightly thickened. X-ray of the swelling showed a large calcified mass of racemose pattern but organized structures were absent. The cord was divided at the internal ring and orchidectomy performed (H. S. S.). The upper two-thirds of the specimen was a tumour mass which distended the tunica and the lower third was normal testicular tissue. The predominant tumour tissues were hyaline cartilage and fibrous tissue but there were areas of calcified cartilage and calcareous deposits with small trabeculæ of true bone and a few ill-defined acinar structures were present. The pathologists' opinion was that histologically there was no evidence of malignancy but it could not be excluded that a pre-existing malignant focus had been obliterated by calcification after the establishment of metastases which at this time were not clinically or radiologically manifest. It was labelled a teratoma of non-adult type.

Case 5.—A.B., aged 30.

This Maltese rating had felt pain in the left testis, which was ectopic in the superficial inguinal pouch at the external abdominal ring, but no increase in size was noticed. This testis was slightly larger than its normally descended mate and specific testicular sensation was present. There was no clinical or radiological evidence of metastases. The testis was removed and the cord divided after traction at the internal abdominal ring (H. S. S.). The testicle was of average size and on section showed areas of degeneration which were histologically seminoma tissue. At the time of operation it was impossible to arrange deep X-ray therapy and the patient was returned to duty until summoned for review one year later. A fixed nodular retroperitoneal mass was palpable just to the left and above the umbilicus. X-ray of the chest was negative. Deep X-ray therapy was arranged.

Case 6.—F.M., aged 28, single.

Admitted complaining of pain and swelling in the left testicle of three weeks' duration. No trauma. He had had bilateral orchidopexy when aged 16. The testicle was sprung firmly just below the external ring, was smooth, tender, hard and normal in shape, but slightly larger than the apparently normal right testicle. Specific testicular pain was not obtained over and above common acute pain. There was no clinical or radiological evidence of metastases. Orchidectomy was performed and the cord cut at the external ring (G. K. H.). The epididymis was found strung out from the testicle as with an undescended testicle. There were areas of hæmorrhage in otherwise homogenous testicular tissue, surrounded by a thick tunica. Histology showed seminoma tissue with cord involvement.

CLINICAL ANALYSIS.

The history is short in this series (two weeks in Case 2) except for Case 4 which is a case apart.

The size of the swelling varies enormously being small in Cases 5 and 6, which are examples of malignancy supervening on imperfectly descended organs, and relatively large in Cases 1 and 3 where increase in size has been the presenting feature.

The notable fact in Case 1, where the testis was replaced entirely by growth, was the persistence of specific testicular sensation. On the other hand a portion of normal testis remained at the lower pole in Case 4 yet specific testicular sensation was absent. This suggests that the condition of the nerve fibres in the region of the rete testis is an important factor in determining the maintenance of specific testicular sensibility.

Invasion of the tunica vaginalis did not occur in any of these cases, the tunica albuginea forming a dense barrier with the weakest part at the rete testis, through which spread the disease in Case 2. Even in Case 3 where blood was aspirated there was no spread through the tunica albuginea and it is likely that the blood was drawn from the insensitive testis destroyed by malignant disease. It seems more common for the surface of a neoplastic swelling of the testis to be regular in contour than otherwise.

Thickening of the cord is noted in two cases but this sign was of doubtful help in diagnosis. A common cause of a thickened cord is hypertrophy of the cremaster which occurs with any chronic testicular enlargement. Should nodularity be felt this feature is diagnostic of malignant disease.

Cases 5 and 6 record the development of malignant disease in imperfectly descended testes, ectopic in Case 5 and high scrotal in Case 6, the latter having had orchidopexy performed twelve years previously. The presenting feature in both these cases was the spontaneous onset of pain and when the testis was felt it was found larger than its mate. This definite though small enlargement was striking in Case 5 where this ectopic testis was larger than the normally descended right testis. Both these testes contained areas of recent hæmorrhage which had presumably caused pain by sudden distension of the tunica albuginea. When pain and the smallest enlargement of an imperfectly descended testis are present the possibility of malignant disease makes early orchidectomy advisable although subacute torsion of the testis may make preoperative diagnosis difficult.

Case 3 illustrates the danger of confusing the diagnosis with acute traumatic hæmatocele. Unless the injury is sufficiently severe to cause immediate swelling and bruising which resolve

in a week or two, malignant disease must be considered in a rapidly growing swelling of the testis and operation is warranted.

Case 4 gave no history of trauma and the diagnoses considered were calcified spontaneous hæmatocele and calcification in a teratoma of low grade or non-malignancy. In either case the organ would be destroyed and orchidectomy was justified.

It is repeated in these cases that there was no clinical or radiological evidence of metastases. This is done to emphasize the fact that, although there may be no Osler's tumour, no enlarged Virchow gland in the left supraclavicular fossa, no enlarged inguinal glands in a case previously subjected to orchidopexy with scrotal fixation by sutures (such as one of us (H. S. S.) has seen), and no X-ray evidence of lung secondaries still, without examination of the urine for gonadotrophic content, metastases cannot be eliminated. It has not been possible to perform a Frank, Aschheim-Zondek or Friedman test on the urine of these cases.

A short history of pain or enlargement of a testicle in the absence of inflammation or gross trauma is the main feature in the diagnosis of malignant disease. "Weighing" the testicle has not been found useful. Secondary hydrocele has not been encountered in this series. Specific testicular pain may or may not be present in a neoplasm of the testis and this sign can be of little value in the differential diagnosis from gumma in which condition, indeed, testicular sensibility is not invariably lost.

DISCUSSION.

The differential diagnosis of a tumour of the testis may invoke almost all possible pathologies but, if the more common ones, viz. chronic epididymitis, torsion, gumma, chronic hæmatocele (traumatic, spontaneous or calcified) be considered, the history of onset, physical and serological examinations, urinalysis and radiology should make preoperative diagnosis possible. If there is still doubt it is likely that in any case the local disease should be eradicated or that the testis is functionless. It would be wrong to ignore the principle of cancer surgery that the lymphatics and vessels be obliterated before the growth is tackled and such is the sequence of events if the operation is exploratory. It is considered that the decision to perform orchidectomy should be made before operation, then the cord divided after traction at the internal ring, and orchidectomy completed.

Cabot and Berkson [1] have shown that the outlook for patients with a testicular tumour is not hopeless, even in the presence of metastases. These workers advise orchidectomy followed by deep X-ray therapy whether metastases be present or not. They show that 50 per cent of the patients who had seminomas without metastases survived ten years or more and that 37·5 per cent survived for a similar period even though a metastasis was present at the time of orchidectomy. Every effort has been made in this series to obtain X-ray therapy after orchidectomy and it is hoped that some of these patients will remain in the Services.

The importance of a knowledge of the gonadotrophic content of the urine may well be exemplified in Case 4. It appears from the findings that the tumour may be simple. However, a case is quoted by Prym [2] in which spontaneous healing or regression of a primary testicular tumour occurred, with death of the patient later from chorion-epithelioma metastases. It seems right to consider this possibility in Case 4 and it has been arranged that X-ray therapy will be given this patient when and if his urine contains "prolan."

We are indebted to Major C. W. Kidson and Major E. Geal for their pathological examinations, to Lieutenant-Colonel W. E. M. Mitchell, M.C., for the opportunity to study Case 2, and to the Commanding Officers, Colonel F. Whalley, D.S.O., T.D., K.H.P., and Colonel G. D. Harding, for permission to forward this article.

REFERENCES.

- [1] Quoted by FERRIS, D. O. *Proc. Mayo Clinic*, 1941, **16**, 615.
- [2] PRYM, P. *Virchow. Arch. f. Allg. Path. and Path. Anat.*, 1930, **49**, 98.
Quoted by BONN, H. K., and NEWTON EVANS. *Amer. Journ. Surg.*, 1942, **58**, 125.

Editorial.

SURGEON-GENERAL SIR JAMES McGRIGOR, Bt.

WE publish in the current *Journal* a very excellent broadcast account of Surgeon-General Sir James McGrigor, Bt., Chief Surgeon to Wellington and the first Director-General of the Army Medical Services ; an account which deals with him not only as a most distinguished Army Medical Officer but particularly as an Aberdonian both by birth and by university. In publishing it, we think that a few stories about him might not be out of place, particularly as the " broadcast " deals chiefly with the later and more successful years of his life. A glance at Sir James' autobiography provides us with a delightful picture of his young days and his first experiences as a Regimental Medical Officer after joining the Service. He was born in 1771, the eldest of three sons of a prosperous merchant of Aberdeen, Colquhoun McGrigor, and his wife Ann, daughter of Lewis Grant, Esq., of Tethendry, in Strathspey, Inverness-shire. As a medical student he and a friend, Dr. Robertson, founded the Aberdeen Medical Society (1789), now one of the most distinguished of its kind. Entering the Army, his father purchased a surgeoncy for him in General de Burgh's Regiment, the newly raised 88th, the Connaught Rangers. He would have preferred at that time to be sent to a Scottish regiment, but, as the gentleman who was responsible for such appointments said, " a Scotchman will make his way in an English or Irish regiment but in one of their own there are too many of them together. They stand in the way of each other." The Connaught Rangers had just been raised and, as the only Englishman in it, Major Keppel, told McGrigor, all the other officers were Irishmen from Galway and all related to each other. They were a distinctly creditable lot and anxious to keep up the good name of the regiment but they were nevertheless " fire eaters " when the opportunity arose as the following story will show. At a certain Garrison Mess to which they all belonged, their own mess equipment not having yet arrived, the officers of the 88th were in the habit of rising from the table at a certain sign and getting away before things got too vivacious. McGrigor was sitting beside a friend of his, Captain Sparrow, of another regiment, when the signal to be off was given. Sparrow, in great good humour, put his arm round McGrigor's shoulder and tried to detain him. " You and Nicholson had better wait a little longer," he said. McGrigor thought he ought to go so he and Nicholson said goodnight to their friends and went out to join the rest. They found them in high dudgeon ; all of them much annoyed by Sparrow's gesture of putting his arm on McGrigor's shoulder ! When they got back to their lines a meeting was summoned and, though McGrigor and Nicholson protested that it had all been in the friendliest spirit, it was decided that the regiment had been insulted and that the two officers must send a challenge to Sparrow and his friend. This challenge was duly written and poor McGrigor had to send it ! But Sparrow knew the circumstances and, rather than fight a man whom he liked greatly, actually apologized on parade, a very fine gesture when one remembers that the Service at that time put regimental honour on a high pedestal !

He remained with the Connaughts for the first eleven adventurous years of his Army life and was evidently a much-beloved member of the mess. He served in Flanders where he got a bad attack of typhus ; he went to the West Indies ; was separated from his regiment by a chain of unfortunate circumstances and became attached to the 24th with which he saw active service at Grenada ; returned to England ; went with the 88th to India ; was sent with an expedition to Egypt, now being a rather senior officer, and gives an amusing account of his adventures there ; ran a large establishment of servants, horses, goats, pigeons and everything that could be useful and held, among his other duties, a special commission from the East India Company to be Chief Medical Officer of the Indian Corps. He tells a romantic story of how he rescued three ladies from a horrible fate. Hearing the agonized

cries of women and the sound of hoofs outside his billet, he and his servant ran out and saw three mounted Turks pursuing a group of females; one was actually cutting at them with his scimitar! McGrigor rushed forward and, taking a pistol from his servant, bade the Turks desist. They stopped their pursuit for a moment and, the servant coming up with McGrigor's horses, they began to ride away. McGrigor galloped after them and getting quite outside the lines reflected that the three Turks could master him if they turned and so drew rein and let them go. It appears that these ladies, Circassians and blessed with a certain amount of beauty, had first attached themselves to the French Army, then to the British, and were being taken by the Turks to be put in sacks and dropped into the Nile as a reward for their liking for the Christian dogs; a fate which had already overtaken many of their sisters!

These amusing stories are told here to illustrate the lighter side of a life which was always spent at high pressure and of which the fruits are to be found in generous accumulation at a later date. As our friend says in his "broadcast," McGrigor's endeavours and his gradually acquired experience, added to a natural brilliancy, led finally to the formation of the germ of the Royal Army Medical Corps. He returned home, was gazetted to the "Blues," had much to do with the successful evacuation of large numbers of sick from the Walcheren Expedition and, after his marriage to Miss Grant in 1810, was finally sent to join Lord Wellington in Portugal. Here he had the real success of his life and his talks with the Duke (as he became) make the most interesting reading. After an inspection of Lisbon, Coimbra and Clerico, he proceeded to Headquarters and was asked to dine with Lord Wellington. The latter reminded him of their meeting in Bombay and of the 88th and then said "I hope from your long living with them you have not contracted any of their leading propensities; for I hang and shoot more of your old friends for murders and robberies than I do all the rest of the Army!" "At this point," remarks McGrigor, "I felt somewhat abashed which Lord Wellington observing continued 'One thing I will tell you, however; whenever anything very gallant, very desperate, is to be done, there is no Corps in the Army I would sooner employ than your old friends the Connaught Rangers.'" At Wellington's request he came next day with his hospital reports and happened to meet Brigadier-General Stewart, the Adjutant-General, at Headquarters. The latter said "that I might come to his office and he would transact my business for me with his Lordship whom it was unnecessary to trouble. I replied that I preferred doing business directly with Lord Wellington and that it was by his Lordship's desire I came there. At this moment the door of his little inner apartment was opened by Lord Wellington who, nodding to me, desired me to come in. After this I daily made my appearance to take his orders."

After Vittoria, finding Wellington in a very good humour, McGrigor tried to manage something that had been in his mind for a long time. He spoke about his medical officers.

McGrigor: "Nothing could more gratify these officers, nothing could be a greater incentive to their exertions on future occasions, than your noticing them in Dispatches."

Lord Wellington: "Is that usual?"

McGrigor: "It would be of the most essential service."

Lord Wellington: "I have finished my Dispatch—but, very well, I will add something about the doctors."

"This," says McGrigor, "was the first time that their merits had been publicly acknowledged."

His subsequent career is well known. Wellington said of him, "He is one of the most industrious, able and successful public servants I have ever met with." He became a Knight in 1814, was made Fellow of the Royal Society in 1816, a Baronet in 1830, and was Director-General of the Army Medical Services from 1815 to 1851. He died, crowned with honour, in 1858. To look at his statue by the Mess one would hardly suspect him of having been a dashing Connaught Ranger as a young man—but one gets an inkling of it in the eyes that look out from his famous portrait by Willkie and which are full of a boyishness that not even age and success could diminish.

Clinical and Other Notes.

"SCOTTISH PORTRAIT."¹

FOUNDER OF THE R.A.M.C. SIR JAMES McGRIGOR.

BY ALEXANDER KEITH.

SITTING in the Court Room of Aberdeen University the other day I found myself gazing at the portrait of a resplendent figure—half military, half academic. Obviously a person of some eminence, the robes of a graduate hung upon the full-dress uniform of a general in the British Army. Closer inspection revealed that the artist was William Dyce, R.A., a notable painter of the second quarter of the nineteenth century. The subject was Sir James McGrigor, Director-General of the Medical Service of the British Army, and this was the portrait presented to the University by the students in the years 1826-27 when Sir James was Rector of Marischal College. A smallish spare man with iron grey hair, none missing, over a broad forehead, a twinkle in both eyes, a nose that conforms to no national standard, a wide mouth, again with a twinkle in it, and a strong square chin jutting out over the braided collar of the uniform. That is what I saw. It was very quiet in the Court Room but that same gentleman of the portrait, for all his robes and his twinkles, had been in much less peaceful places.

When the war with Napoleon I had ended and the British troops, who had fought their way through the Peninsula, were entering Toulouse, a British officer found himself mobbed by a huge crowd of the citizens. "Vivent les Anglais," they cried, but with far more animation than the presence of an ordinary officer warranted. Eventually he discovered that they had mistaken him for the Duke of Wellington. There was a likeness, except as to noses, and the officer in question had probably done more than any other individual, except the Duke himself, to ensure the victories that had carried the British colours over the Pyrenees into France.

Yes, you're quite right, the officer was the man of the portrait, James McGrigor, not yet Sir. When I called him an ordinary officer I did him an injustice. He was emphatically extraordinary. Wellington said he was worth a division to him any day. For James McGrigor was the founder of the British Medical Corps. You hear a lot about hospital mismanagement in the Crimean War but, if James McGrigor hadn't served some forty years before in the Peninsula, there would have been no hospitals to mismanage. I'd go further and say that had McGrigor been young enough to accompany the troops to the Crimea, the scandal of hospital inadequacy would never have arisen.

For James McGrigor was one of the great figures in medicine on, I think one should say, the business or organizing side of the profession. He was a bit of a pioneer. When he went out to the Peninsula in 1812 such hospitals as existed were in a deplorable state. In this respect the French Army was far in advance of ours, for Napoleon had eagerly adopted Larrey's system of flying field hospitals and Percy's introduction of stretcher-bearers. McGrigor's achievement lay rather in what, in the first Boche war of 1914-18, we would have called casualty clearing stations and base hospitals.

Before he went to the Peninsula he had seen service in India, the West Indies, Egypt and elsewhere and had carried a name for himself as the soldiers' doctor. On one occasion when he was posted to a regiment, the members exhorted his predecessor to "Get home as soon as you can, now your master has come." He strove to improve the very deficient quality

¹Broadcast March 13, 1944. Published by kind permission of the British Broadcasting Corporation and the author.

of the medical service by getting better pay and pensions for Army surgeons, and by some means he infused his own spirit into the corps so that the medical officers, in intervals of peace, went and improved themselves in their knowledge of their profession.

While M.O. to the Connaught Rangers, McGrigor had been involved in several disputes with its Colonel, afterwards Marshal Beresford, the man who so nearly lost the Battle of Albuera. Beresford had the worst of the exchanges and became the firm friend of the doctor. Something the same, on a bigger and more influential scale, happened with Wellington. In 1805 McGrigor was promoted a deputy inspector of hospitals. He had the handling of the sick and wounded who were disembarked at Portsmouth from Sir John Moore's army after Corunna and during the disastrous Walchaeren expedition. His masterly improvisation and organization gave him a standing which was of the utmost help to him. He cleaned up the administration of the medical services in Portugal. Wellington objected to some of his regimental and brigade arrangements—and those arrangements are substantially the ones now in operation in the Army. McGrigor thereupon set up a field hospital which overtook the enormous congestion of casualties by wounds and disease caused by the capture and sack of the fortress of Badajoz.

At long last Wellington permitted McGrigor to establish regimental hospitals but the point was gained only after a bit of a struggle. Wellington, himself a great organizer, could admire an organizer and McGrigor proved conclusively that he was as competent in his own line—in planning and foresight—as Wellington in his. After Salamanca McGrigor ordered up commissariat transport and supplies to cope with the sick and wounded. Summoned to the Commander-in-Chief's presence, he found Wellington having his portrait painted. McGrigor told him what he had done. The Duke—always touchy upon the subject of orders—sprang up and talked very violently, "I shall be glad to know who is to command the Army, I or you?" However, an Aberdonian then was not easily intimidated. Very soon afterwards, when the British had to retreat from Burgos, Wellington was anxious not to leave the hospitals to their fate. McGrigor, however, despite his recent dressing-down, had already commandeered all the empty ration and ammunition carts and sent off all his casualties in them in good time to the rear. The result was that Wellington could withdraw his army without being hampered by hospital cases and with the roads clear behind him. He congratulated McGrigor who, greatly daring, recalled the Duke's recent reprimand and said the action for which he had reproved him had justified itself. "It is all right as it has turned out," said Wellington, "but I recommend you to have my orders for what you do." But thereafter it was Wellington who did everything McGrigor asked, not the other way about, and at Vittoria McGrigor repaid him by having 5,000 convalescents fit for service who had not been expected.

Here, now, is a curious coincidence. At one end of Europe the Director of Medical Services in the Army opposing Napoleon's was James McGrigor, M.D., of Marischal College, Aberdeen, who, between the battles of Salamanca and Vittoria, had put 93,000 sick and wounded through his hospitals. At the other end of the Continent where the Russian Army confronted Napoleon, the Director of the Tsar's army medical service was John Wyllie, M.D., of King's College, Aberdeen's other University, who is credited with having performed over 200 operations at the Battle of Boredino alone.

Now having heard all this, you will have, I've no doubt, a big question mark in your mind. Why should a couple of unknowns from far Aberdeen have made such a reputation in medicine? Well, their medical pioneering was quite in keeping with an ancient and long-sustained Aberdeen tradition of being first in medical matters. But first of all, I should tell you that sometimes it is a little difficult to understand how Aberdonians in those days became doctors at all. McGrigor was educated at Marischal, the "toun's collidge" of Aberdeen, and in respect of medicine as easy going as the elder and rival University of King's. Thus McGrigor's Professor of Medicine combined lectures on that subject for many years with the hardly cognate chair of Oriental languages. That was not quite so bad as the worst spell at King's when two Bannermans, father and son, from 1793 to 1838, held the Chair of Medicine and never delivered

a lecture. It was the elder Bannerman's nephew, Sir Alexander, by the way, who became Governor of Newfoundland and, incidentally, was the husband of Margaret Gordon, the first sweetheart of Thomas Carlyle. Yet in those days Aberdeen turned out doctors who, for their time, were as progressive as they are now. To return to our Aberdeen medical tradition. In 1493 Aberdeen passed a regulation—the first of its kind in Britain—for the control of venereal disease—it runs this way. "The alderman and council statut and ordanit for the eschevin of the infirmitez comin out of France and strange partis" certain rules which need not here be recapitulated. Though in McGrigor's time both colleges were slack in their attention to medical teaching, they could at least crow over all other universities in the land in some respects. King's College, founded on the model of the University of Paris in 1495, had a Professor of Medicine or Mediciner from the outset. It was not until 1540 that Cambridge had a medical chair and Oxford followed six years later. So Aberdeen was half a century ahead. Then, of course, medicine was just a subject in the ordinary course of general study. Not till 1654 did King's confer its first degree of Doctor of Medicine, and the recipient, John Glover, was described as of London, and was by some curious chance a B.A. of Harvard University. Before that time, the mediciner had petitioned the Privy Council in vain for the bodies of "executed malefactors, rebels and outlaws," to practise anatomy on. Before that time, too, three men had passed through one or the other of Aberdeen's Universities, taken their medical degree elsewhere, and become physicians to the King. Alexander Reid and Arthur Johnston were physicians to Charles I and Robert Morrison to Charles II. Reid's brother was Latin Secretary to James I and, in that way, came to present his alma mater with an unusual gift—a bundle of books belonging to the library of St. Paul's Cathedral, which the King had borrowed and forgotten to return—he was good at that. But if King Jamie had been quite honest and sent them back they would have been destroyed in the Great Fire of London. As it is, they and one other volume are the only ones remaining of the original library of St. Paul's Cathedral. However, that's by the way.

In the history of medicine, McGrigor deserves a place beside two other celebrated Aberdonian doctors—George Cheyne, London's fashionable physician in Queen Anne's day, who introduced dietetics to the notice of the public and inaugurated the first wave of nutritional fervour of which we are to-day experiencing the fourth tide; and Sir Patrick Manson, whose researches led directly to the discovery of the mosquito's part in the spread of malaria and so made possible a great advance in the civilization of the tropics.

But now to come back to my portrait—after the Peninsula War McGrigor was knighted and later got a baronetcy. He became Director-General of the Army Medical Department and remained at his post until 1850, about eight years before his death. He went to the Hunterian School to study anatomy and chemistry. He established insurance and benevolent funds for medical officers. He built up a military surgical museum, which at his retirement contained among other things nearly 6,000 specimens in natural, morbid and comparative anatomy, and a regular golgotha of skulls—over 500 human crania. To the library he gave 1,500 volumes besides begging nearly 9,000 more from his friends.

All this, you may say, is a pretty long way from the up-to-date R.A.M.C. of our own times. Since McGrigor's death in 1858 medicine has changed out of all recognition. Anæsthetics, marvellous curative drugs, the most delicate instruments, the motor car, the aeroplane, have revolutionized the medical side of warfare. Disease, which used to be as deadly as wounds, to-day claims a trivial number of victims, and wounds themselves, which meant death or complete disablement in nearly 50 per cent of cases in McGrigor's time, are now so promptly and effectively handled that the proportion of those who die after admission to hospital is quite incredibly low. Yet all things must have a beginning and, if McGrigor hadn't brought his genius for organization into the service, military medicine might not to-day have been in so satisfactory a condition. Even his experiments in hospital arrangement and management and in the transport of casualties, crude as they were by modern standards, helped to define the right road to efficiency which the Royal Army Medical Corps to-day faithfully follows.

A.S.H. "MINOR" FÆCES DESTRUCTOR.
SMALL STANDARD PERMANENT TYPE.

BY MAJOR FREDERIC EVANS, *M.B.E.*,

Royal Army Medical Corps,

AND

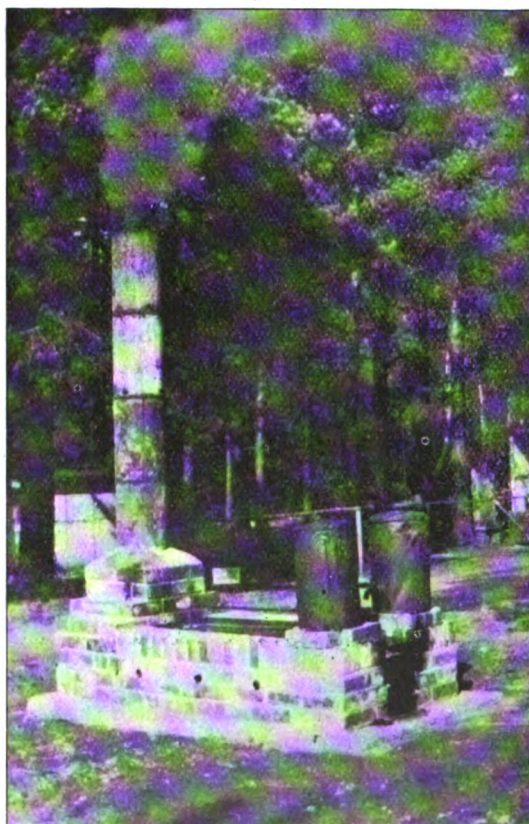
MAJOR H. H. CLAY,

Royal Army Medical Corps,

Army School of Hygiene.

(1)

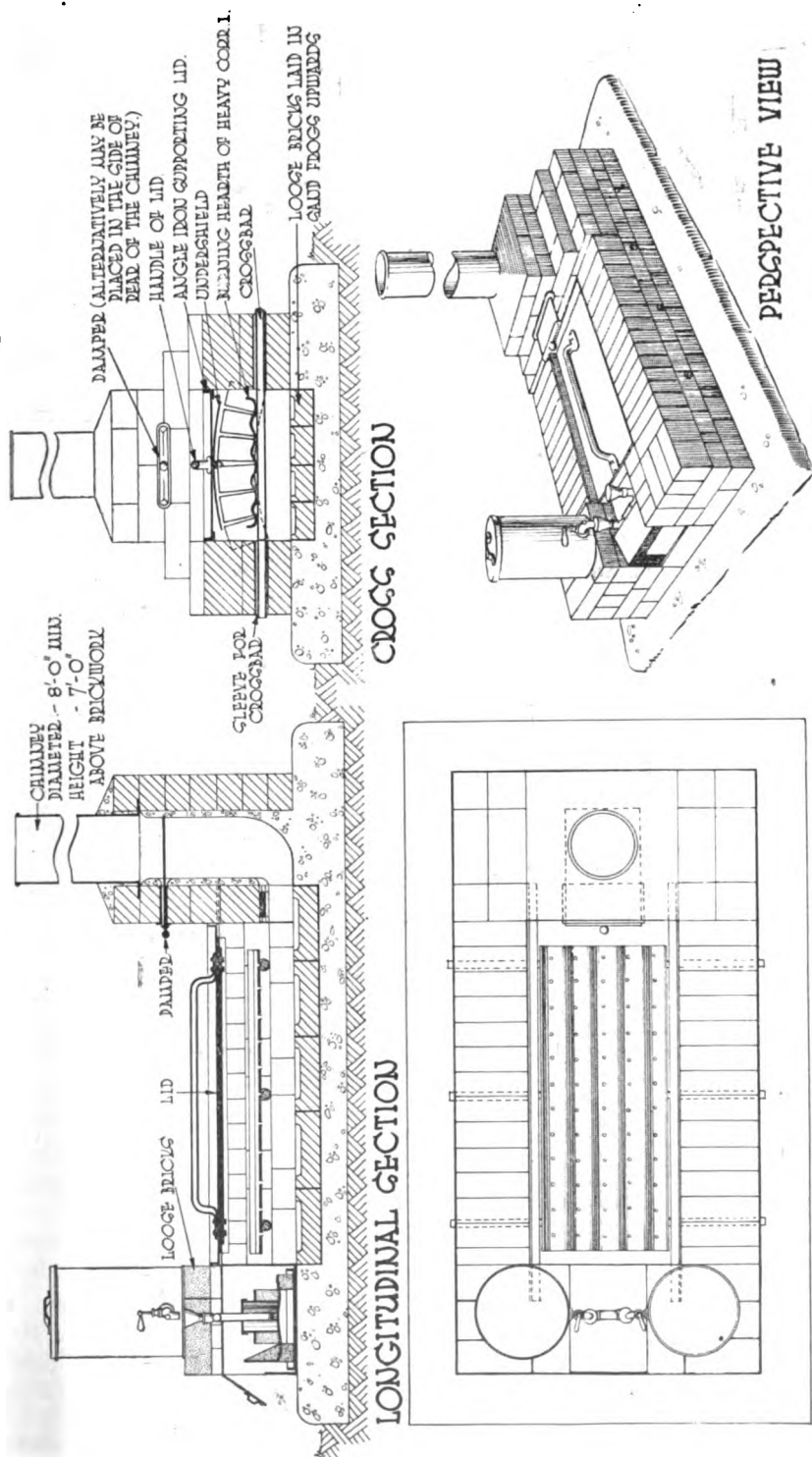
FOLLOWING the production of the A.S.H. Standard Type Fæces Destructor [1], work was undertaken with the object of producing a smaller type of destructor capable of dealing with the contents of bucket latrines for personnel up to 250 per day, and which could be improvised in the field. The result was the A.S.H. Improvised All-Metal Destructor [2].



This destructor has been well tried out in the field and has proved to be of great practical value. From the nature of its construction, however, it has no great lasting qualities, and the appliance is suitable for adoption mainly in camps of a transitory character.

The need has now arisen for a Fæces Destructor blending the more effective qualities

A.S.H. 'MINOR' FÆCES DESTRUCTOR



DESIGNED BY G. E. BOWEN
 LATER GASTON B.
 AND H. CLAY & H. H. HALL



FIG. 1.

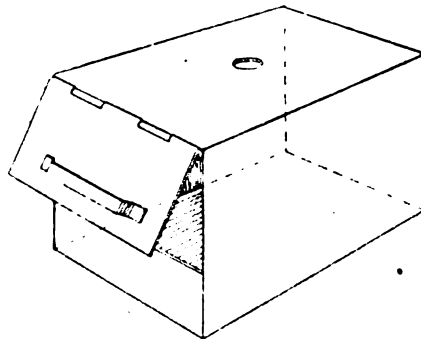
PLAN (LID REMOVED)
 12111 SCHOOL OF ANGIENT DRAWING OFFICE MARCH 1944

of each of these two destructors, i.e. a capacity of 250 per day suitable for construction as a permanent unit.

The A.S.H. "Minor" Faeces Destructor, details of which are shown in fig. 1, is designed to meet this need. The principles which governed the design of the earlier models have proved to be sound in practice. The chief of these are as follows :—

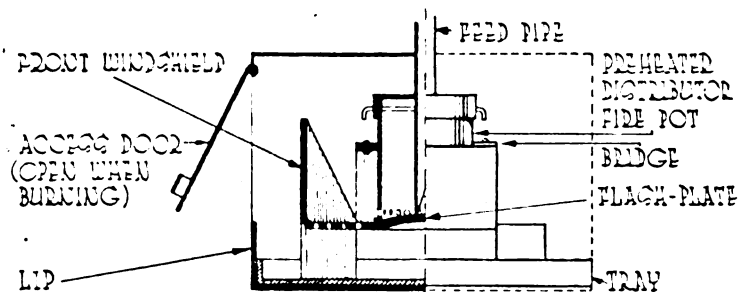
- (a) The design is low in elevation ; buckets can be emptied into the destructor cleanly and with minimum effort.
- (b) The whole contents of a bucket, liquid and solid, are dealt with.
- (c) The semi-liquid contents are automatically spread out thinly over a burning hearth of large heating surface and are then subjected to direct heat, both below and over the surface.
- (d) The gases produced are not discharged in crude form into the chimney but are subjected to flame and are effectually combusted.

These principles are incorporated in the "Minor" Destructor but owing to its reduced



VIEW OF BURNED CAGING

FIG. 2



LONGITUDINAL SECTION & ELEVATION

FIG. 3.

capacity considerable modification has been rendered possible in its construction. The urine tray is abolished. Liquids pass through perforations in the burning hearth on to loose bricks laid "frog" upwards in the concrete base. These are raised to a very high temperature and the liquids are rapidly and completely disposed of. The burner is a separate and self-contained unit and no front access doors are necessary.

The bars supporting the burning hearth which are subjected to great heat, and therefore are liable to bend, are housed in "sleeves" (short pieces of pipe of larger diameter) built

into the brickwork. The bars may thus be withdrawn and straightened as and when required.

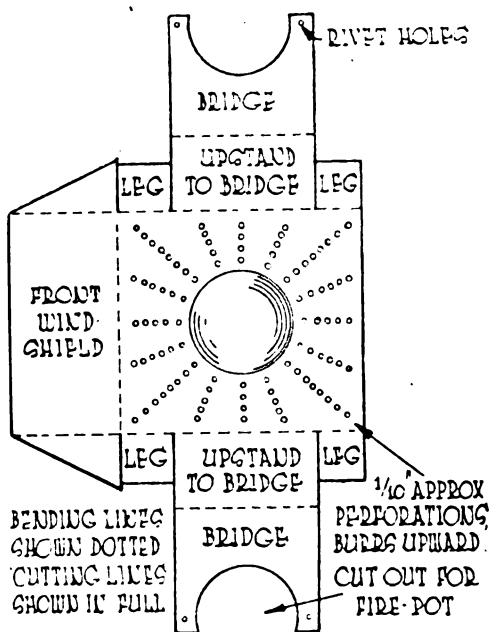
No reinforced concrete cover is required. The dimensions of the destructor permit of a metal lid large enough to close the furnace but not too large to be easily manipulated by hand.

The main body of the destructor is constructed in 9 inch brickwork set in lime mortar having a small admixture of Portland cement. The top course is a brick on edge. The baffle arch and flue are similar to those of the Standard Type Destructor..

Details of construction are clearly shown in the drawings.

(2) THE BURNER.

The burner assembly is similar in principle to that used previously in the A.S.H. Destructor as modified for the All-Metal type. It is however contained in a stout iron box of



DEVELOPMENT OF THE OIL & WATER FLASH BURNER.

FIG. 4.

square cross section (fig. 2) and the oil and water are fed through a pipe coming through the top of the burner unit, this pipe having two branches on a "T" piece, each fitted with a simple tin funnel. This conveys the oil and water into a preheater-distributor pot resting centrally upon the burning plate which has a wide fixed shield (fig. 3). The burner box is made to have a cover for closing the outer end when the lid of the destructor is lifted for filling, etc.

Details for the construction of this burner, as adapted for this type of destructor, are shown in figs. 2, 3 and 4. The arrangement allows the oil and water containers to be stood on the destructor itself (fig. 1) thus making for a "clean" design and the obviation of a separate stand for the oil and water containers.

The burner assembly is made as a unit which can be slid easily out of position for purposes of cleaning and repair.

(3) WORKING ROUTINE.

- (a) Clean the burner, remove and clean faeces-burning hearth, take out cross bars and straighten ; if necessary, sweep out dust, etc., from bottom of destructor and flue. Reassemble parts taking care that the burning hearth is evenly spaced from the walls.
- (b) Light oil and water flash burner and warm up destructor.
- (c) First Filling.—50 pounds of faeces (i.e. one bucket filled without slopping) including contained urine which drains through holes provided in the burning hearth on to the hot bricks below. Spread faeces thinly over the burning hearth. Break up surface of faeces at intervals of fifteen minutes, to speed up drying, closing the burner cover door and opening the damper before doing this. When the faeces on the hearth begin to show signs of burning, extra air can be admitted to assist their combustion by pulling the burner assembly outwards about half an inch.

Note.—BEFORE THE DESTRUCTOR LID IS LIFTED FOR TIPPING IN OR BREAKING UP FÆCES, THE DAMPER IN THE CHIMNEY SHOULD BE OPENED FULLY AND THE COVER DOOR AT THE BACK OF THE BURNER MUST BE LOWERED TO THE VERTICAL POSITION. (This is to prevent “backflashing” of the flame.)

WHEN THE DESTRUCTOR LID IS REPLACED, THE COVER DOOR OF THE BURNER SHOULD AGAIN BE LIFTED AND THE DAMPER OPENED TO THE REQUIRED POSITION.

(4) PERSONNEL.

One man properly instructed in these duties should be sufficient to take charge of the destructor so long as the faeces are brought to him by others from the latrines.

(5) CAPACITY.

With four to five fillings a working day of six to seven hours is implied. One bucket full of faeces plus the urine normally contained in *LATRINE* buckets weighs about 50 pounds (the faeces of from 60 to 70 men). Four or five fillings would thus represent the matter to be destroyed from 200 to 300 men.

SCHEDULE OF MATERIALS.

Bricks.....	200
Cement	1 cwt.
Lime	$\frac{1}{2}$ cwt.
Sand.....	1 cub. yd.
Aggregate (ballast or broken brick)	1 cub. yd.
Angle irons, 4 ft. 6 in. by $1\frac{1}{2}$ in.	2 pieces
Lid, with undershield and handle,	
Approximately 3 ft. 5 in. by 1 ft. 6 in. in heavy sheet iron (to fit).....	1
Burning hearth (for faeces) in heavy gauge corrugated iron (turned up $1\frac{1}{2}$ in. at two long sides only).	
Approximately 3 ft 0 in. by 1 ft. 5 in. nett	1
Cross bars 1 in. solid iron or iron barrel $\frac{3}{4}$ in. internal dia.....	3
Damper 1 ft. 0 in. by 9 in.....	1
Sleeves (to house the cross bars) 9 in. by $1\frac{1}{4}$ in. int. dia.....	6
Chimney bar (arched) 2 ft. 0 in.	1
Chimney not less than 8 in. dia. Height above brickwork 7 ft. 0 in	1
Oil drums (oil and water) with taps ($\frac{1}{2}$ inch) and covers (5 gallon).....	2
Rake or Hoe (all iron) length 5 ft. 0 in.....	1
Fire Box and Burner in heavy gauge sheet iron (oil and water flash fire).....	1

SPARES SHOULD BE HELD AS FOLLOWS :—

Cross Bars.

Burning Hearth for faeces.

Burner for oil and water fire.

The authors are indebted to Colonel E. B. Allnutt, M.C., Commandant of the Army School of Hygiene, for permission to send these notes for publication.

REFERENCES.

- [1] A.S.H. FÆCES DESTRUCTOR, *Jnl. Roy. Army Med. Corps*, 78, No. 5, May, 1942, 209-219.
- [2] PORTABLE ALL-METAL DESTRUCTOR, *Ibid.*, 81, No. 2, August, 1943, 86-88.

NOTES ON A CAPTURED ITALIAN MOBILE BATH UNIT.

BY MAJOR M. MARKOWE,

Royal Army Medical Corps.

THE Bath Unit is entirely mobile and self-contained, the whole of the apparatus being carried on a three-ton lorry.

The heating apparatus is housed at the rear. The method of heating the water is on the geyser principle, water being fed into the boiler by either current pressure or pumped by means of a semi-rotary hand pump and heated by six burners (kerosene or diesel) of the primus type. Fuel is fed to these burners under pressure which is maintained by a hand pump fitted on the floor of the lorry. Two tanks of approximately five gallons each are fitted for the fuel supply. The change over from one tank to the other is by the simple process of turning a tap.

The remainder of the lorry is fitted with various compartments to house the rest of the equipment during transportation. This equipment is composed of canvas side curtains, semi-rotary pump for water supply, hoses, forms, step ladders and tools, etc.

The body of the lorry is so constructed that the top and sides are doubled so that, when in operation, the outer portion slides back and so forms a shelter extension. The sides are then lifted and supported on specially constructed poles and brackets. Eight sprays each side (sixteen in all) are fitted to the roof of this extension. There are sufficient duckboards to fill the area covered by the sides and roof. Canvas screens are attached to the sides, thereby enclosing the whole unit.

Provided there is a constant flow of cold water to the boiler hot water will be available in a continuous supply. The temperature can be varied by a special mixer valve.

There is also an additional system whereby disinfectants or deodorants may be mixed and fed into the hot water supply.

The whole of the apparatus is one which shows compactness and mobility. It is very simple to operate although complicated at first sight owing to the profusion of different coloured pipes which seem to lead in all directions. This appears to be typical of the Italian engineering technique.

This Mobile Unit compares very favourably with our own type of Mobile Bath Unit which is certainly heavier, more cumbersome and deals, for the equivalent subsection, with only five showers.

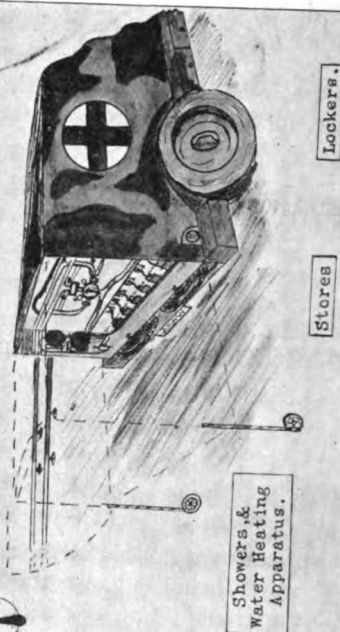
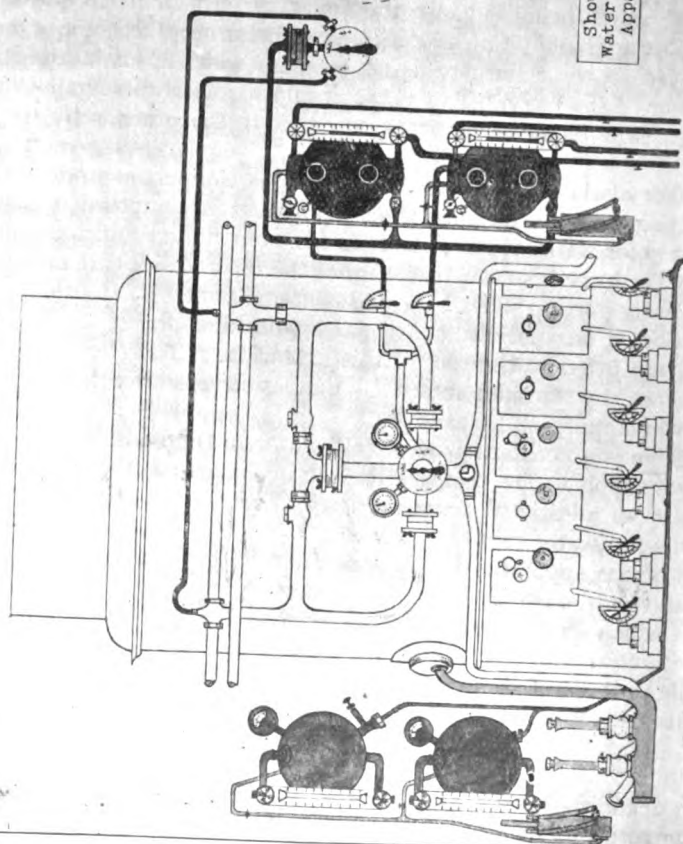
I wish to acknowledge the assistance of the Workshop Staff of this Fd. Hyg. Sec. in experimenting with different designs and Privates T. W. Weldon and F. Baxter, R.A.M.C., for the excellent illustrations. My thanks are due to Colonel P. F. Palmer, A.D.M.S., for permission to forward this article for consideration.

ITALIAN MOBILE BATH

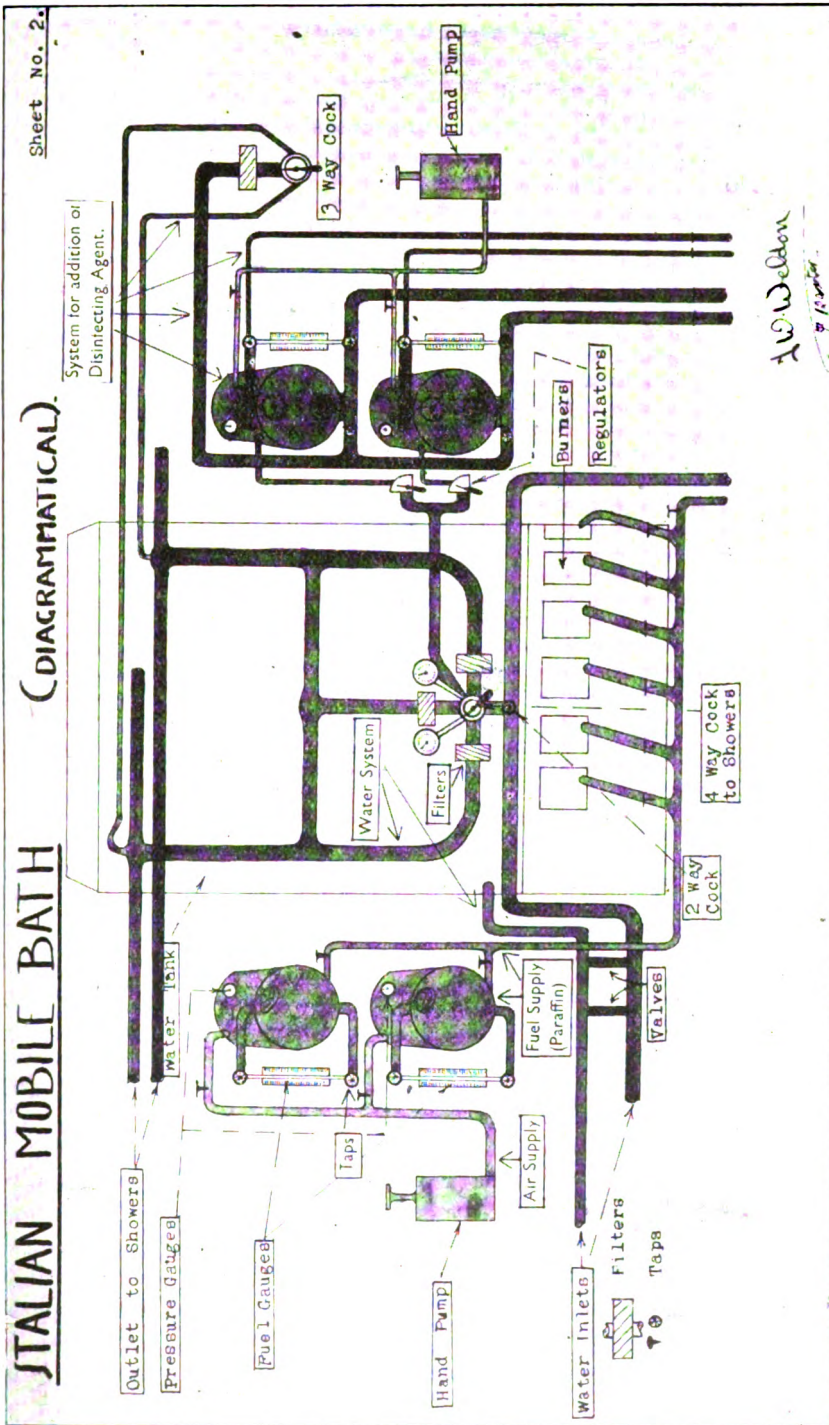
Sheet No. 1.
(To be read in conjunction with Sheet 2).

Eight Shower Roses, attached to each Side
Extension of the Sliding Roof.

The whole apparatus is conveyed on a Three-ton
Lorry.



1000000000



Current Literature.

BRANDT, A. Bacilltypene ved menneske-tuberkulose i Norge. [**Types of Tubercle Bacilli in Human Tuberculosis in Norway.**] *Norsk. Vet. Tidsskr.* 1940, No. 6, 234. [Summary taken from *Vet. Bull.* 1941, June, v. 11, No. 6, 351. Initialled J. E.]

A detailed description is given of Brandt's method of preparing cultures on Petraghani's solid medium with or without glycerin, and of the cultural characters of the three types of tubercle bacilli grown thereon.

It is stated that TB. in cattle is rare in Norway (0.15 per cent among 1½ million cattle slaughtered from 1931-38), but is more common in pigs and poultry. Of 160 tuberculous pigs examined, 80 per cent were infected with the avian type bacillus, 17.5 per cent with the human type, and 2.5 per cent with the bovine type.

Among 1,224 specimens of sputum, etc., from cases of human pulmonary TB., only two were of the avian type infection and none of the bovine type; there were two cases of bovine type infection among 265 cases of bone and joint TB., one bovine type among 23 cases of lymph node TB., and one avian type among 42 cases of skin TB., all the remainder being of the human type.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

FRANCIS, T., JR. **The Problem of Epidemic Influenza.** *Trans. & Studies of College of Physicians of Philadelphia.* 1941, Feb., v. 8, No. 4, 218-27, 2 charts. [40 refs.]

The author briefly reviews the main epidemics of influenza which have occurred since the discovery of a causative virus in 1933 and gives an account of the present position with regard to the two types of influenza virus, A and B. For a time it was thought that a single virus might be responsible for all epidemic influenza, because the many strains isolated in different countries and at different times all showed a close antigenic relationship to the original WS virus. It is true that antigenic differences could be demonstrated by refined serological methods but the antigenic factors common to all were sufficiently dominant to justify the acceptance of all known strains as variants of a single virus. This virus is now known as Influenza A virus.

The possibility that other viruses might have equal claims to aetiological significance in influenza was recognized in 1936 when a widespread epidemic of acute respiratory disease occurred in California. This outbreak had all the clinical and epidemiological features of typical influenza, but no virus could be recovered from any of the patients, nor did serum antibodies against Influenza A virus develop during convalescence. This experience was repeated in 1940 during an epidemic in the south-eastern zone of the United States; here again all attempts to incriminate Influenza A virus failed. Fortunately about this time a virus was recovered from a small institutional outbreak of acute respiratory disease and a re-examination of acute and convalescent sera, derived from patients of the 1936 and 1940

epidemics, showed that these major outbreaks must have been caused by the new virus which is now known as Influenza B virus. It was also found that some previous epidemics of the period 1933-40 must have been of mixed character, including both A virus and B virus cases.

No antigenic relationship could be demonstrated between the A and B viruses by cross neutralization tests, complement fixation tests and cross immunization experiments in mice; they must therefore be regarded as two distinct viruses, either of which may give rise to true epidemic influenza. [See also *Bulletin of Hygiene*, 1941, v. 16, 379, 380].

WILSON SMITH.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

BURNET, F. M. & FOLEY, M. Two Methods for the Detection of Influenza Virus in Human Throat Washings without the Use of Ferrets. M. J. Australia. 1941, Jan. 18, v. 1, No. 3, 68-72, 2 figs. [16 refs.]

Several workers in England and in the United States have experienced difficulty in obtaining strains of influenza virus by ferret inoculation from apparently typical human cases, especially during inter-epidemic periods.

Methods of isolating influenza virus independently of the ferret would be of special value in such cases, and would be cheap and convenient. Two such methods are described in this paper. One of them—the "amniotic inoculation method"—has already been described by Burnet [*Bulletin of Hygiene*, 1940, Vol. 15, 696]. In the second method, filtered garglings are inoculated intranasally into mice which are subsequently tested for the development of immunity.

A 10 c.c. gargling is mixed with 5 c.c. of broth and filtered through paper; 0.05 c.c. of the paper filtrate is instilled into the nose of each of a batch of mice some of which are re-inoculated fourteen days later with stock virus, while others are bled and their sera titrated. The rest of the paper filtrate is passed through a Gradocol membrane of pore diameter 0.8 μ , and then injected in 0.25 c.c. quantities into twelve-day chick embryos. Four days later, these are examined for lung lesions and changes in the tracheal fluid.

Of three members of a hospital nursing staff who developed influenza, two were sampled forty-eight hours after the commencement of their illness and one as soon as the illness started. Ferrets inoculated with filtered garglings from the first two cases failed to show any reaction, but virus was recovered from both by the amniotic injection method, and mice inoculated with washings from these two patients developed some immunity. Virus was not obtained from the third patient by any method.

The two new methods may, therefore, succeed when ferret inoculation fails.

Both of the virus strains obtained differed from the strains prevalent in Melbourne, showing a closer affinity with the "W.S." strain. A method of testing the antigenic affinity of a strain by active immunization of mice is described.

E. T. C. SPOONER.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

Reviews.

ORTHOPÆDIC SURGERY. (Third Edition.) By Walter Mercer, M.B., Ch.B., F.R.C.S. Edin., F.R.S. Edin. London : Edward Arnold & Co. 1943. Pp. xi+947 with 415 Illustrations. Price 45s.

A third edition of this book is welcome at present, and particularly to the military surgeon, for this is the only reasonably full and up-to-date work of its kind published in these islands. Its only rivals are either too short to be of much help to the practising surgeon or else have not been revised for twenty or more years.

This new edition reviews most of the recent work which has been published since the second edition of 1938. Despite many additions to the text the author has only added 42 more pages and it is to be regretted that circumstances have compelled the production of this, longer, edition in a smaller and less sturdy format and in a very much weaker binding.

Like its predecessors, this new edition gives a very complete yet succinct account of modern British orthopædic practice. It does not attempt to deal with recent fractures and dislocations neither is it an encyclopædia of orthopædic operations but it achieves its main object in a manner which is usually clear and efficient.

The chief defects of the work remain unchanged. It often attempts too much and its advice on treatment sometimes deteriorates into a list of eponymous operations somewhat uncritically recommended. Many such operations, such as Mr. H. A. Brittain's spinal fusion, are still very much on trial while others are almost antiques. Who nowadays performs cuneiform tarsectomy for club-foot (p. 52) or finds sequestrectomy of a tuberculous tarsus "frequently called for?" One finds with surprise that treatment with colloidal sulphur is recommended in some detail for osteoarthritis.

The military surgeon who turns to this work for advice about the most pressing orthopædic problems of the Army in training will be disappointed. The accounts of disabilities of the knee, feet and back follow the well-worn custom of systematic descriptions of many varied conditions with little help in the differential diagnosis and little guide as to what to expect from treatment. Good as these sections are they could be more helpful if these subjects were approached more from the point of view of a clinical problem and less from that of a textbook of systematic surgery. In connexion with backache sacralization of the fifth lumbar transverse processes receives an attention which most surgeons would consider undue.

The illustrations require further revision. Fig. 97 is meaningless: one regrets that a SINGLE hip spica is shown in the treatment of hip tuberculosis; fig. 185 shows a shoulder immobilized ABOVE the right angle; fig. 442 is frankly misleading and the illustration of Lambrinudi's operation for drop foot seems to have missed the main object of the deviser of that admirable procedure.

Despite these (possibly minor) criticisms the book remains an excellent and authoritative guide to orthopædics. It does what it sets out to do and does it well. It is a book which can be recommended with confidence to the senior student, the junior orthopædist or the general surgeon whom circumstances compel to "brush up" orthopædics.

MEDICINE IN BRITAIN. (British Life and Thought Series No. 17.) H. Clegg. London : Messrs. Longmans Green & Co., Ltd. 1943. Pp. 46. 10 photographs. Price 1s.

This is an admirable, timely and readable booklet. It gives a fair and adequate outline of the historical and present aspects of medicine in these islands and provides knowledge of many facts which are perhaps incompletely known to doctors as well as to the lay public.

Much of its usefulness lies in the provision of a good account of the medical services as they now exist ; this may be set beside those plans for the future, now under active discussion.

Almost everything is included from the medical student to the General Medical Council. It is to be hoped that in future editions space may be found for some account of the medical services of the Armed Forces of the Crown. In this issue they are mentioned only as adding " another bright hue to the medical quilt." J. W. H.

SUPPLEMENT TO THE EXTRA PHARMACOPŒIA. (Martindale.) Volume I. Twenty-second Edition. London : The Pharmaceutical Press. 1943. Pp. 48. Price 2s.

Since the publication of the first volume of the twenty-second edition of the Extra Pharmacopœia in May, 1941, many changes have been made, chiefly arising from war conditions, in the B.P. and the B.P.C. These changes are embodied in the Addenda to the Pharmacopœia and in the Supplements to the Codex. The 48-page Supplement to the Extra Pharmacopœia which has been published (Pharmaceutical Press, price 2s.) summarizes, in tabular form, the various additions and amendments, reference being made wherever possible to the corresponding page numbers in volume I. The Supplement includes also a list of the preparations of the National War Formulary as well as additions to the U.S. Pharmacopœia (U.S., p. xii) and to the American National Formulary (N.F. vii). Notes are given on recent Statutory Orders affecting the supply of drugs and on new proprietaries not included in volume I. C. B.

BOLLETTINO SANITARIA DELLA TRIPOLITANIA. Vol. II, No. 1, January, 1944.

We have received from the P.M.O., British Military Administration, Tripolitania, a copy of the first printed edition of the above medical *Bulletin*, produced entirely by the Italian medical staff.

Printed in Tripoli (at the outset the work of reproduction had to be carried out and distributed on typewritten sheets), this *Bulletin* may be regarded as a welcome sign of more settled conditions and an indication of collaboration between the British and Italian medical professions.

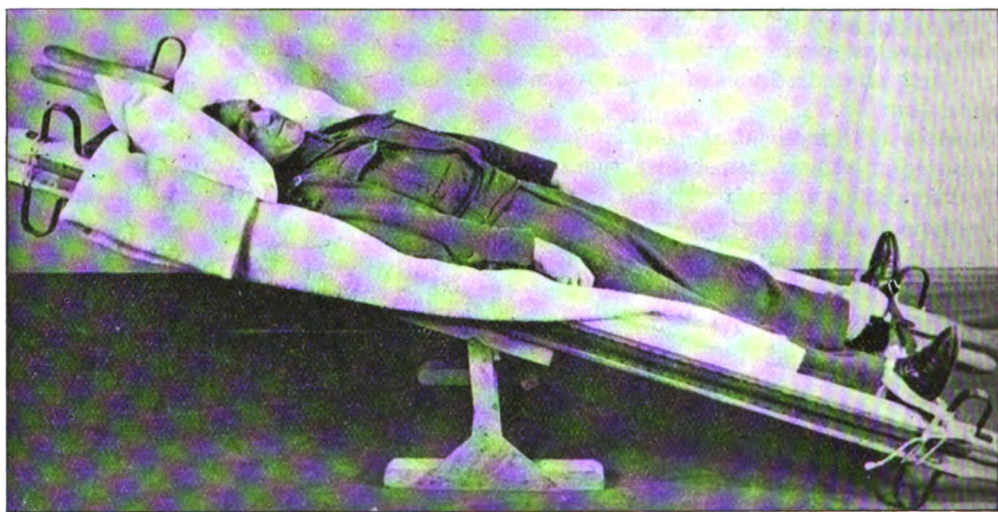
Correspondence.

A SIMPLE ARTIFICIAL RESPIRATOR.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Captain Nathan's article on the application of the Rocking Method of Resuscitation to military contingencies, in the January, 1944, number of the *Journal*, has evoked the interest which it deserves. Having examined his article in detail and applied his methods on conscious patients with paralysed limbs but normal respiration, I would like to report some comments of a practical nature.

Captain Nathan has found that when rocking a normal subject through an angle of 25° the tidal air compares favourably with the results obtained by Schafer's and Silvester's method on normal subjects. He admits that theoretically some of this ventilation may be due to voluntary respiratory efforts on the part of the subject, but states that he was able to influence the failure of the tidal air by altering the angle of rocking, and concludes that it is the rocking which produces most of the respiratory exchange. His figures,

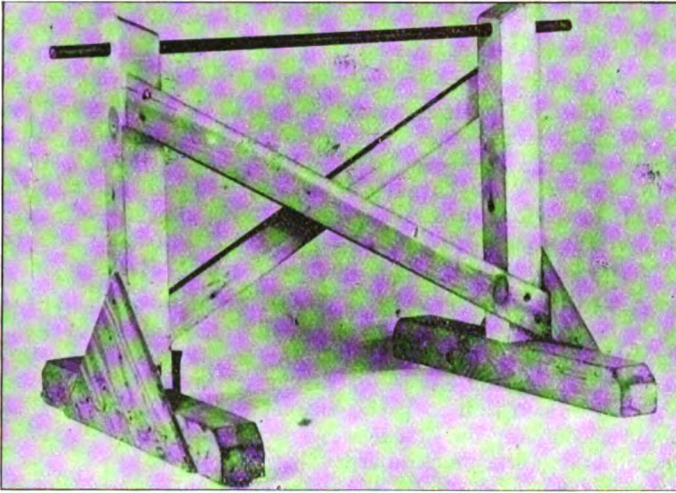


however, do not consistently support this conclusion and it would be necessary to submit his method of low angle tipping to a practical test on asphyxiated subjects before accepting his thesis. There seems to be little doubt that the Chinese sponsors of high angle rocking have found it effective in practice. Nevertheless Captain Nathan's method has many practical advantages in the field and opportunities should present themselves for its trial in cases of poliomyelitis, ascending polyneuritis and high cervical injuries.

The apparatus suggested by Captain Nathan has one disadvantage. It is necessary to fix the patient to the stretcher in such a way as to avoid friction, with its disastrous effects on the pressure points of a paralysed patient. The universal stretcher sheet may be effective but it is not a general issue and would not be available to ordinary field units. An alternative method which I have found effective in preventing friction in paralysed subjects is to use two stretchers. The first is fitted with two grooved wooden blocks to take the axle of the pivot, as described by Nathan. The second stretcher is placed upside down on the first to which

it is lashed at the four corners. The patient is placed on top of this inverted stretcher and his feet, in boots, are firmly secured to the metal cross-bar in the angles between the cross bar and the poles of the stretcher. With the feet secured in this position the patient does not slip on the stretcher during rocking. The head and shoulders are supported on folded blankets to protect them from the cross bar at the head end. This method obviates friction and secures easy access to the patient for regular evacuation of the bladder.

The wooden stand suggested by Nathan has been found effective but many alternatives may be improvised. For transporting the case by ambulance, rocking can be carried out



by placing the patient on his stretcher in the aisle of an ordinary 2-ton motor ambulance. A wooden or iron cross bar resting on the stretcher racks of the ambulance is a suitable pivot since it so happens that when the upper rack is lowered to its full extent in a standard ambulance it is the correct height from the floor for allowing the stretcher to be tilted at the required angle of 25° . It is important that whatever type of pivot is used it shall engage properly with the wooden sockets on the undersurface of the stretcher if smooth working is to be obtained.

I am, Sir,

*Military Hospital
(Head Injuries),
Oxford.*

March 24, 1944.

Yours, etc.,
F. A. ELLIOTT,
Major R.A.M.C.,
Command Neurologist.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in **duplicate** through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a *nom-de-plume*.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twenty-five reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twenty-five excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

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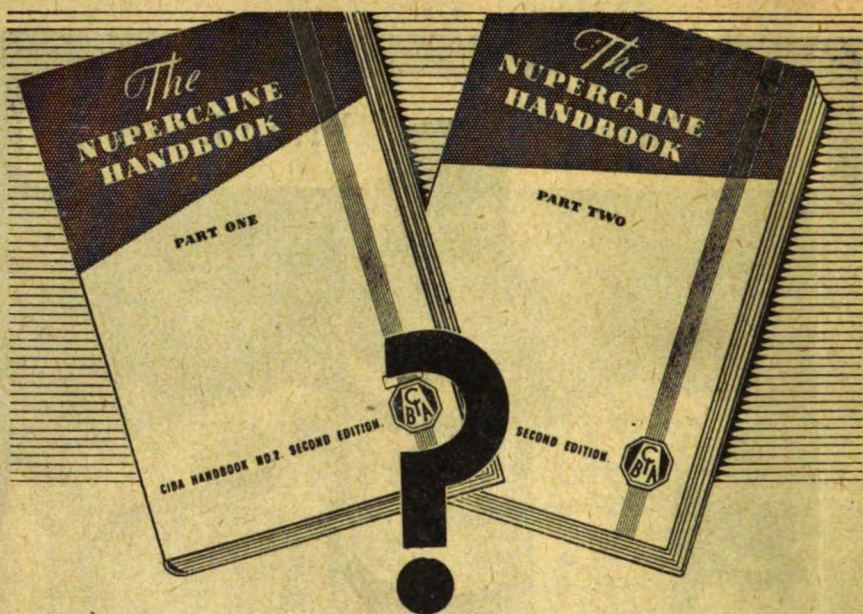
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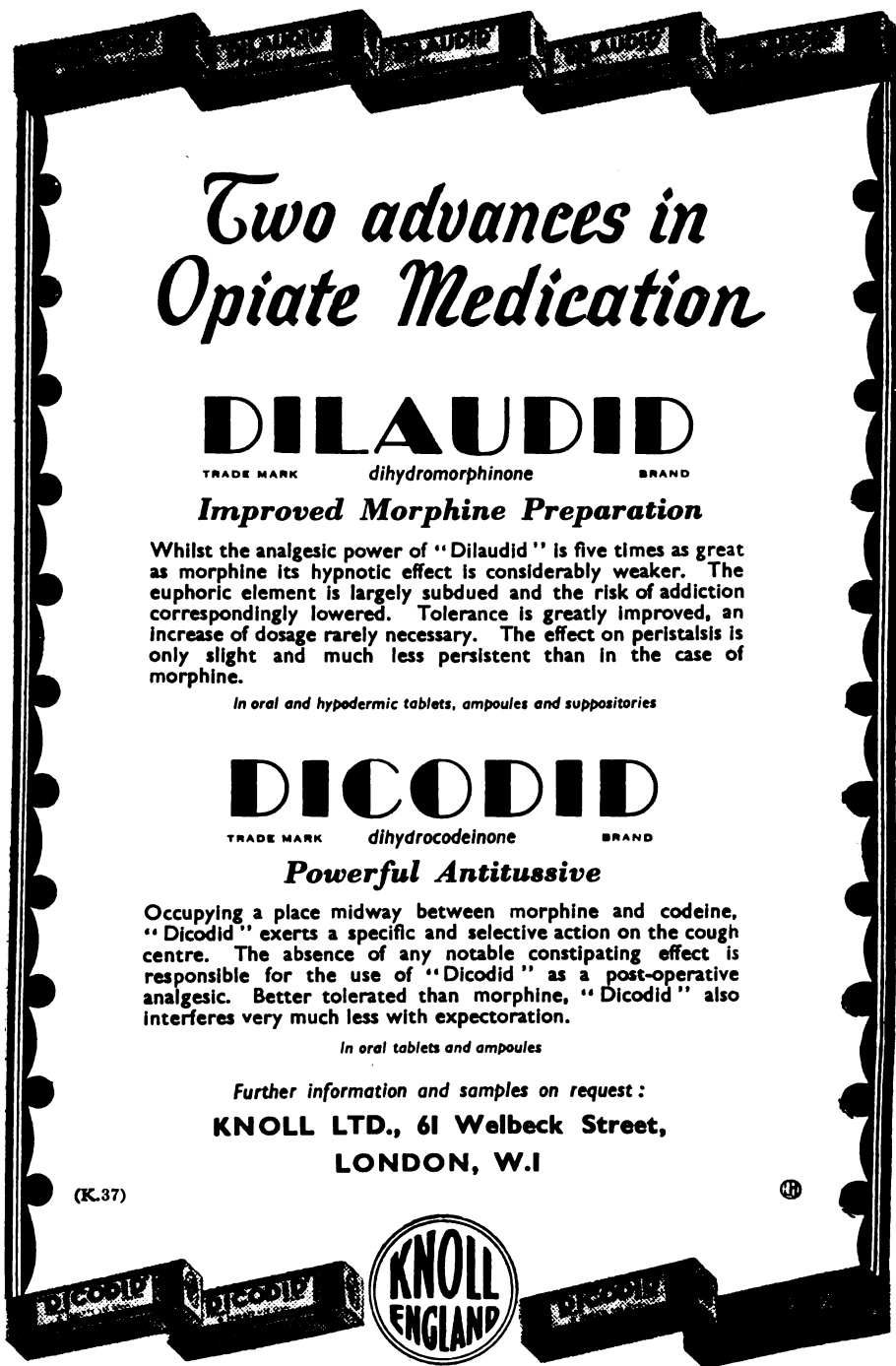
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Original Communications.

THE ARMY MEDICAL SERVICES: WARTIME ACTIVITIES AND DEVELOPMENTS.

INTRODUCTORY.

STOUT-HEARTED brawny men, carrying the helpless hurt across shell-spattered seas of

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exist, is a fact of the very greatest significance.

But the collection, evacuation and treatment of the sick and wounded and the tireless work of the consultants, specialists and general duty officers, though the best known, are by no means the only contributions of importance which the A.M.S. make to military affairs. Indeed, it is not improbable that those whose onerous task it has been to create and maintain huge armies out of an unprepared civil population for urgent active service in widely differing parts of the world would present the view that, in the ultimate analysis, among the most valuable contributions have been :—

- (a) the selection from among the Army intakes of those individuals and those types who, in virtue of their physical and mental qualities, could be expected to flourish biologically under the conditions of active military operations in environments to which they were not accustomed ;

¹Reprinted, by kind permission, from *The Army Quarterly*, Vol. xlvii, No. 2, January, 1944.

- (b) the education of these individuals in the techniques of establishing a harmonious relationship between themselves and their novel environments ;
- (c) the banishing of disease-provoking agencies from these environments or the achievement of a maximum degree of control over these agencies ;
- (d) the reinforcement, by artificial means, of the natural defensive mechanisms of these individuals, so that they might thereby be more fully protected against the disease-provoking agencies which they are likely to encounter in the environments to which they were proceeding ;
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The search for new scientific knowledge and the application of this to human and social affairs are greatly accelerated and intensified by society's reactions to the urgent needs of war. When peace returns we shall find ourselves in possession of vast additions to our knowledge of our own species and of the earth which we inhabit and must dominate. We shall, as the direct result of this war, be far better equipped to tackle and to solve the problems of world reconstruction, particularly those which involve human migration and the breaking down of the barriers of disease which so far have stood in the way of man as he has explored and attempted to claim dominion over vast areas of the earth's surface.

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Man is remarkable among living things for his natural ability to adapt himself to the widest range of environmental conditions by reason of his powers of physiological adjustment and of his ability to profit from experience. He is remarkable also for the magnitude of the control he can exercise over the forces of his environment, harnessing these to his needs, transforming an uncongenial habitat into one suitable for himself.

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As far as climatic options are concerned, as judged by the difference of any great means. It is possible for all these, nevertheless the time required varies with different individuals. We as a people are more in our own country than we are elsewhere. It is possible for us to venture into and adapt ourselves to its climate.

This adaptation is greatly affected by matters which concern the environment under conditions that range from the dank sweating jungles to the arid deserts. The established physiological standards of small men only for service in the tropics have been found desirable to accustom them to artificial equivalents.

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This adaptation is greatly aided by modifications in dietary, external covering, etc., matters which concern the Directorate of Hygiene, through whose efforts camouflage under conditions that range from those of the snow-capped altitudes of the Arctic to those of the dank sweating jungles of the Tropics is made more possible. It would be reasonable to apply established physiological facts to the utmost in such selection—to select slightly different men only for service in the tropics, for example—but this is not feasible. It has been found desirable to acclimatize troops to strange environments in advance by exposing them to artificial equivalents.

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if ever, encountered the more lethal living enemies of health, the causal organisms of epidemic disease and so, concerning them, he was ignorant and careless.

To train a recruit in the techniques of combat is a relatively simple matter, consisting as it does of indoctrination, introduction to weapons and exercise in their use. But to educate such a man so that he may flourish biologically under adverse environmental conditions is exceedingly difficult. Yet this is what must be done for, otherwise, he will quickly eliminate himself by falling sick with preventable disease.

It is the responsibility of the A.M.S., and of its Directorate of Hygiene in particular, to produce and elaborate the doctrine of private and public sanitation and incessantly to preach it. It is for the regimental officer, and for the individual soldier under his tutelage, to practise it. The maintenance of health is the responsibility and the duty of the individual.

THE CLEANSING OF THE ENVIRONMENT.

The maintenance of the health of the individual, however, cannot be successfully undertaken by the individual member of a large community. It demands co-operative and co-ordinated effort directed by a specialist organization. The activities of the Directorate of Hygiene, like Gaul of old, are divided into three parts. One has already been mentioned, the application of established physiological fact in problems of man-management : the others are the exercise of measures for the prevention of epidemic disease and the application of sanitary science to military affairs.

The causal organisms of many of the diseases to which armies are particularly prone are universal in their distribution. Their spread is made possible by the fact that an army is a large congregation of human beings, in intimate contact one with another, living under difficult conditions. They spread from the affected to the previously unaffected by contact, by way of air, water, food, or are carried by flies, mice, rats, which are attracted to those places where human beings abound.

Man is not a clean animal and, unless strongly disciplined or cared for by others, will quickly create the conditions in which epidemic disease rages. Such diseases can be controlled if the causal organisms can be banished from an army's environment or if their dispersal is checked. The hygiene specialists are responsible for the maintenance of the highest standards of general sanitation in areas occupied by troops, ensuring that refuse disposal is thoroughly satisfactory, that the ventilation and spaciousness of billets are sufficient, that purified water is available, that food remains uncontaminated and that pests are controlled. They keep the most careful look-out for a threat of an outbreak of epidemic disease so that they may unleash in good time all their agencies of segregation and disinfection in order that its spread may be prevented. Under the static conditions of camp life, the health of the Army is safeguarded to a degree unknown to a civil population for the reason that the health of the soldier is recognized as being of paramount importance.

Superimposed upon these ceaseless activities of the Hygiene Directorate, connected with the strict maintenance of environmental cleanliness of this general kind, is that of malaria prevention. A glance at the map will show that any expeditionary force operating to the east and south of Marseilles must encounter an enemy far more powerful and dangerous than armies composed of men of political and social faiths differing violently from our own. This enemy is malaria. It has been estimated that in any year some 800 millions of human beings are ill with this disease and that some $3\frac{1}{2}$ millions die of it. Its distribution over the globe is known as is also its seasonal incidence. Those who plan campaigns are fully informed of what is to be expected if they decide to operate in a malarial area in the malaria season.

The methods employed by the A.M.S. in the control of malaria are threefold :—

- (a) those directed towards the elimination or to the control of the numbers of the malaria-parasite-carrying-mosquito—denying to it its breeding grounds by the construction of appropriate drainage systems ; killing off its larval form by coating the surface of static water with chemicals ; large scale and systematic mosquito-killing by means of insecticides blown into places where they rest ;

- (b) those directed towards the prevention of biting on the part of the mosquito—repellent creams to be smeared on the exposed parts of the soldier's skin ; the provision of mosquito nets and veils ; the wearing of long sleeves and trousers at the end of the day ;
- (c) those directed towards the endowment of the soldier with a resistance to the malaria parasite should the infected mosquito, in spite of all the above-mentioned measures, succeed in biting—the routine administration to troops of drugs that suppress malaria.

The continued supply of quinine, the specific anti-malarial, and of pyrethrum, the active agent of most insecticides, was suddenly denied to us when the Japanese overran their main sources in the South Pacific and this loss might well have meant the end of all continuous campaigning in many parts of the world. The reactions of the British and American Medical Services and Supply Ministries were strong and immediate, however. Subsidiary sources of supply of pyrethrum in Kenya and elsewhere were quickly and greatly enlarged and British and American industrial firms multiplied the means of extraction a hundredfold so that the threatened crisis was avoided. Though as yet there is not sufficient for all civilian as well as military needs, production advances rapidly, whilst Allied chemists eagerly search for substitutes more easily provided and of equal power.

The loss of quinine might have had catastrophic repercussions. The reason why it did not makes an interesting story. As would have been expected, chemists all over the world, as is their habit, had for many years been attempting to take quinine to pieces so that, knowing what it was, they might produce it artificially. As long ago as 1932 the Germans had produced such a synthetic drug which they called Atebrin. They had distributed this widely, enlisting the aid of medical men all over the world to try it out in cases of malaria. It was amazingly and dramatically successful. Now in those days, coinciding in time with the coming into being of the Third Reich, the manufacture of atebrin was a German monopoly. It was easy to see that, under certain conditions, this drug could give to the expanding Wehrmacht an overwhelming advantage in war.

The German Dye Trust sold the secret of its manufacture to an American firm and when so doing omitted to give certain essential details of its synthesis. However, American and British chemists had not been idle : they themselves were producing atebrin and, as the threat of war grew louder, production was stepped up, American, British and Dominion firms pooled their knowledge and their resources and the supply soon became sufficient, with care, to meet the needs of the Allied Armies, though not those of the vast civilian populations as well.

Atebrin (mepacrine) is used particularly for the suppression of malaria whilst the remaining stocks of quinine are reserved for the treatment of patients suffering from the actual disease. The Hygiene Directorate ensures that atebrin is available in sufficient supply and is distributed to all troops entering and leaving malarial regions. It is regarded, together with the rest of the anti-malarial service and equipment, as being of the highest priority. In spite of this, malaria is still rampant, seasonally, among the troops. One reason for this is that it is difficult to determine what should be the standard suppressive dose to be given as a routine measure to all troops ; it seems that the amount required varies rather widely from individual to individual. Furthermore, it is well known that, though atebrin is distributed, much of it is not taken ; some officers and men do not believe in it, others dislike it because it upsets them, still others just cannot be bothered. Altogether the situation is far from satisfactory and demands very careful attention. For the present, atebrin is the best weapon of its kind that is available for universal use in the protection of our troops. The way in which it is used may determine the outcome of a critical campaign.

INOCULATION.

It is established that different species, and different stocks within one and the same species, differ markedly in respect of their resistance towards and immunity from certain diseases. It has, in fact, been shown to be possible, by careful selection and controlled breeding, to create disease-resistant strains of many domesticated animals and cultivated plants.

We as a people, however, are not protected by any natural or acquired resistance or immunity towards diseases as yellow fever, tetanus, smallpox, typhoid, typhus, plague and cholera, the diseases which await our troops venturing into certain parts of the world and which in the past have destroyed armies and decided the results of military enterprises.

It so happens, however, that with advances in the sciences of bacteriology and immunology it has become possible for troops to be given a very high degree of protection against these diseases. The Directorate of Pathology performs the most amazing feats of biological magic by which the human body is educated and trained to defend itself.

The animal body is indeed a remarkable mechanism, able out of its own resources actively to resist the attack of invading organisms, though not always successfully if the violence of the attack is overwhelming. It is possible to educate the body so that its resistance can be in magnitude, out of all proportion to the severity of the attack. Thus, if relatively few suitably prepared, attenuated and innocuous bacteria, or their toxins, are injected into the body, this reacts by the production of "antibodies," one of the means by which the body repels invaders. These antibodies themselves disappear in time, but if this educational stimulus is repeated a few times, with each attack the reaction is increased, greater strategic reserves are massed and flung into the battle. So it is that if the real live disease-producing agent itself gets into the body, this, having been trained to deal with such an event, proceeds to produce antibodies in almost extravagant excess, and the invader is annihilated. The soldier's body in this way is trained to meet and to defeat its enemies.

The following table shows how the Directorate of Pathology equips the Army with defensive weapons, as exquisite in design and in precision as any that the Army possesses, and by means of which troops are enabled to venture with impunity into parts of the world which otherwise would be barred to them.

Inoculations with number of injections.

Territories				Yellow-Fever. Repeat every 2 years	Tetanus. 2 doses— 6 weeks apart— thereafter yearly	Smallpox. On enlist- ment, as when required	Typhoid. 2 doses, 14 days apart, and thereafter yearly	Typhus. 3 doses, 7 days apart, and thereafter 6 monthly, or in face of an out- break	Plague and Cholera. 2 doses, 10 days apart
N. Africa .. ..	..	..	O	+	+	+	+	+	Only in
M.E. .. ..	..	..	O	+	+	+	+	+	face of
Persia and Iraq .. ..	..	..	O	+	+	+	+	+	an out-
India .. ..	..	..	O	+	+	+	+	O	break or
W. Africa .. ..	..	..	+	+	+	+	+	O	epidemic
Ceylon .. ..	..	..	O	+	+	+	+	O	
E. Africa, including Eritrea & Somalia ..	..	..	+	+	+	+	+	+
Gibraltar .. ..	..	..	O	+	+	+	+	+	
Sicily .. ..	..	..	O	+	+	+	+	+	
Italy .. ..	..	..	O	+	+	+	+	+	

It can perhaps be imagined how great are the tasks of this Directorate in the supply and distribution of the vaccines needed by the present-day Army. Yet these tasks are smoothly and most efficiently performed. Since this work is known only to the few, its value is not commonly recognized. This Directorate can rightly claim that, in a war such as this, more lives have been saved through its activities than have been lost by enemy action.

RESEARCH.

Such knowledge as the A.M.S. possesses is incomplete and their methods are imperfect. This is recognized and so it is that all the time active research proceeds with the objects of gaining greater knowledge and greater powers of control. In the field of research the A.M.S.

is guided and greatly aided by the Medical Research Council. In connexion with any disease that constitutes a military problem it usually happens that the M.R.C. sets up a committee, which includes those whose knowledge, wisdom, and skill, being pooled, can hope to solve it. Such a committee, having decided what new information must be sought, makes decisions as to who shall seek it and where. National Research Institutions, University Departments and Army Directorates are set their several tasks and Medical Research units, some civilian, some military in composition, are created and sent out to places where the problem can most profitably be studied. At the present time, for example, there are a heatstroke research unit in Iraq, an infective hepatitis unit and a malaria research team at work in this country and one typhus and three malaria research teams in North Africa, all these being the peripheral agents of M.R.C. Committees. In fact it can be said that there is no medical problem of any magnitude which is not being tackled with the greatest earnestness by the M.R.C. and the Army Medical Services in conjunction—war-wounds, fractures, burns, new therapeutic agents such as the magical sulpha drugs and penicillin are but examples.

As soon as the results of such researches appear, and have been shown to be applicable, they are incorporated without delay into military medical practice. An excellent example of this is furnished by the investigation undertaken by the M.R.C. in collaboration with the medical services of the R.N., Army and R.A.F., on the prevention of sea-sickness by drugs. Many drugs were examined for their ability to prevent sea-sickness in seaborne troops, without impairing military efficiency, and it was found that one appeared to be the most generally useful. Immediately the Directorate of Hygiene took steps to see that the necessary supplies were made available and laid on arrangements for their distribution when required accompanied with instructions as to their use.

Perhaps the largest scale and most spectacular application of the results of research in military medical affairs is to be seen in the remarkable developments in blood transfusion. The last war revealed most clearly that men wounded in battle suffered more or less severely from shock, that this was characterized by a leakage of the blood plasma from the blood-vessels and that, unless this fluid part of the blood was quickly replaced, death quickly ensued.

The earliest form of blood transfusion was the linking up of an artery of one person and a vein of another, the heart of the first thereafter pumping blood directly into the circulation of the second. This method had a very restricted application, for obvious reasons. Furthermore, it was soon found that different individuals belonged to different "blood groups," and that the blood of certain groups produced fatal effects when introduced into the circulation of individuals of other groups. Then it was discovered that in cases of shock the transfusion of whole blood was not really necessary since the plasma could take its place. Next it was shown that plasma could be dried, much as milk is dried, and kept in powdered form.

Out of these and other discoveries a complete Army Blood Transfusion Service was organized by the Directorate of Pathology. It is now so comprehensive, so well designed, and has proved to be of such great value, that it commands the admiration of all who know it. At the Army Blood Supply Depot here in England a donor panel of some 300,000 is maintained. From them blood is obtained periodically and prepared, either as bottled whole blood or fluid plasma, or as dried plasma in powder form, for despatch together with standardized equipment to military hospitals at home and abroad and to the subsidiary blood transfusion units in the field.

A continuous stream of its products flows to the forward medical units on every battle front. Plasma can be used by regimental medical officers for first-aid transfusion on assault beaches and in paratroop landings. At the Advanced Surgical Centres, but a little way removed from the actual battle, a Blood Transfusion Unit consisting of an officer and orderlies specially trained and with its own transport and equipment, tends to the shocked as they pass down the line. Behind these units and feeding them, is the Base Transfusion Unit, which obtains whole blood from troops at base camps and receives bulk supplies from the Depot at home.

This Service can rightly claim that hundreds of lives have been saved and that the average duration of convalescence among the seriously wounded has been greatly reduced as the result of its ministrations.

Had this been written for such as are more impressed by figures and masses of things, it might have begun as follows : Take a score of Albert Halls, distribute them throughout the Commands at home, India and the bases of the Expeditionary Forces, fill them to the roof with drugs, dressings, instruments, apparatus and appliances, and there will take shape the beginnings of an idea of the work and responsibilities of A.M.D.3, that branch of the Army Medical Department which deals with medical supplies. From this branch it is possible to obtain any of these things, from a box of pills to an iron lung, if the correct approach-ritual is observed. Its staff are specialists in foresight for they are called upon to predict what medical supplies the Army will need, usually without knowing what the size of the Army will be or where it will be operating. They are specialists also in the arts of persuasion ; they have to be, for almost every medical officer has his own preferences in respect of drugs and instruments. The shipping situation has added enormously to their difficulties for, no matter how many ships are sunk, the base depots of medical stores of every Expeditionary Force must be kept replenished.

But the story must end though it is by no means finished. As much space again could be used with profit to tell in detail of the worth of the contributions of the Army Dental Corps, of the Q.A.I.M.N.S. and Territorial Army Nursing Service, of the Mobile Ophthalmological Units, of the Physical Development Centres and the rest.

It must suffice, however, to say that those who seek a model of a medical service, comprehensive and complete, organized to meet every need of a community in peace, could not do better than examine the Army Medical Services, organized for and functioning in war.

THE HYPER-PYREXIAL TREATMENT OF GONORRHOEA BY CONTINUOUS INTRAVENOUS T.A.B. VACCINE.

BY CAPTAIN E. CRONIN,
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THE use of sulphonamides in the treatment of gonorrhœa has brought about a dramatic revolution in the speed and response to such therapy. Where, formerly, the time of cure was measured in months or years it is now a matter of days. The results of clinics and hospitals in all countries have agreed on and endorsed the early reports published. Dosage and techniques have varied but the daily administration of five grams of sulphapyridine for four days or sulphathiazole for two days appears to produce a cure in 85 to 95 per cent of cases. Clinical papers are innumerable but these results have been repeated in the later papers of Miescher (1940), Miescher and Schutz (1941), Heyn (1942) and Morschhauser (1942). Where local treatment in the form of irrigations was combined with sulphonamide therapy a slight but variable improvement in results was obtained.

When, therefore, the first cases of gonorrhœa were encountered in North Africa it was hoped that they would prove equally amenable to treatment. We were rapidly disillusioned. Instead of sulphonamide-resistant cases being unusual they became commonplace. Two and three courses of tablets were found necessary, often to be followed by the lengthy and tiresome irrigations that one had hoped to be for ever abandoned.

There appears to be a wide variation in the resistivity of gonorrhœal cases from different localities but, of 100 cases taken at random, either admitted directly to hospital or accepted as part of a routine evacuation from elsewhere, 80 showed gonococci in their urethral smears after a course of sulphapyridine. Of these, after one week of irrigations and a repeat course, 29 were still gonococcus (GC) positive. Many of the remainder still had a profuse discharge although gonococci could not be seen in smears. In some cases the urethral discharge cleared while on sulphonamides, only to recur within one week of cessation of treatment. Drug dosage was along normal lines. Patients were given five grams daily of sulphapyridine or sulphathiazole when the latter was obtainable. This was administered for five days.

Following failure after two courses of therapy, patients were given intravenous injections of gonococcal or typhoid vaccine, commencing with small doses usually advised and increasing on alternate days. No appreciable improvement was noted.

Search for more potent methods of treatment was made. Artificial hyperpyrexia suggested itself. Of the various apparatus used for achieving this the Kettering hypertherm is that employed most frequently. The technique varies but the papers of Desjardins *et al.* (1935), Owen (1936), Ormond (1936), and Simpson (1936) describe representative methods. These consist of keeping the patient at a temperature of 106° F. for five to six hours and repeating the session twice weekly. As many as ten sessions may be given, depending on the difficulty of the case.

Warren, Scott, and Carpenter (1937) are even more exact in their treatments. The thermal death-time at 106.7° F. (the highest temperature that can be maintained in the human being for any prolonged period) is determined for the particular strain of gonococcus isolated from the patient. He is then kept at this temperature for the time necessary.

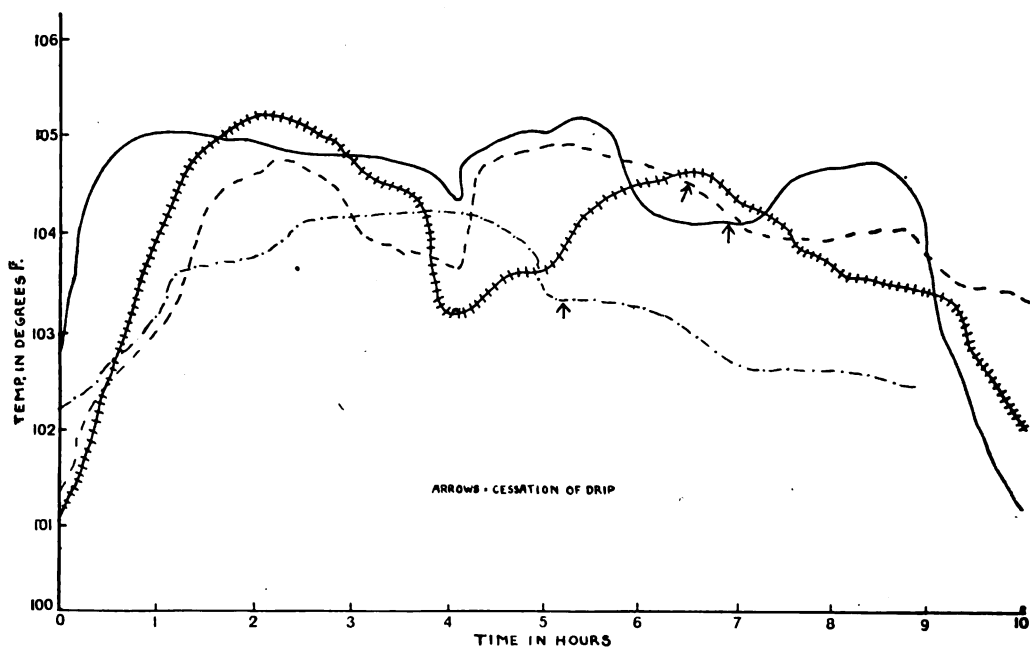
The Kettering hypertherm is expensive, complicated to handle, requires a highly-trained skilled staff to attend to it and fatalities have been reported from its use. To date, only two models exist in England and its cost is likely to preclude its widespread adoption. It does not exist on active service. One was therefore forced to inquire whether any alternative method could be devised for producing a sufficient degree of hyperpyrexia.

It has been known for many years that the intravenous injection of T.A.B. vaccine will

produce a variable and transient rise in temperature. It was therefore decided to investigate the effect of administering T.A.B. vaccine by continuous intravenous drip in glucose saline in the hope of attaining a more intense and prolonged pyrexia. There were certain inherent advantages in this idea. The materials required were at hand and relatively inexpensive and no complicated apparatus was required. In addition to the non-specific value of pyrexial therapy was the additional value of general antibody stimulation which is said to follow vaccine injections.

The work of Ballenger *et al.* (1937, 1939) suggested that cases responding neither to sulphonamides nor hyperpyrexia alone did so when these were combined, often at a temperature well below the thermal death-point of the gonococcus. In all cases except the first, therefore, sulphonamide therapy was combined with the intravenous drip.

Method.—The technique finally evolved was as follows: The patient was given four grams of sulphapyridine or sulphathiazole the evening before. Next morning he was given a further two grams and 0.2 c.c. vaccine injected intravenously. (The vaccine used was the standard Army T.A.B. vaccine containing in each c.c. 1,000 million organisms of *B. typhosus*



and 750 million each of *B. Paratyphosus* A and B). The object of this was to bring about a more immediate rise in temperature. Two hours later the intravenous drip was started. This contained 4 c.c. of vaccine in 600 c.c. of glucose-saline. The solution was run in at the rate of one drop per second and later varied according to the temperature obtained. For reasons discussed later the maintenance of the temperature at or above 103° F. for a minimum of five hours was considered essential. After this time, depending on the ward routine, the drip was discontinued. The temperature started falling within two hours and was usually normal by next morning. Some of the cases received anterior urethral irrigations with 1 : 10,000 pot. permanganate solution for three or four days following, as it was thought that desquamated epithelium and necrotic pus cells formed a nidus for the heavy growth of Gram-positive organisms noted following the drip. The irrigations were thus in the nature of a simple mechanical lavage.

Tests of Cure.—In the absence of facilities for complement-fixation tests or culture the

criteria of cure were necessarily restricted. Reliance was placed on early morning smears and observations of two-glass urines for twelve days following therapy. Before discharge from hospital prostatic smears and spun urine deposits were examined. During the interval patients were placed on heavy trench digging, in itself a searching test of cure. These cases were seen at varying intervals from four weeks to three months after leaving hospital, or notes received from their medical officers. They have all remained symptom-free and shown no evidence of relapse.

CASE HISTORIES.

Fourteen cases in all are presented. The last two are reviewed for, although they have not been followed for a sufficient interval, they present features of interest.

Case 1.—Lance Corporal B. This case, over three weeks, had received 36 grams of sulphapyridine, in two courses, combined with irrigations. Treatment was discontinued owing to the development of a temperature and sulphonamide rash. When seen he had a thick purulent urethral discharge, loaded with gonococci. 11 c.c. of vaccine were given by intravenous drip. A temperature between 103 to 105° F. was maintained for seven hours. He was dry next morning, urines were clear, and he remained so during his stay in hospital. His final test of cure three months later was satisfactory.

Case 2.—Trooper A. He had received 50 grams sulphapyridine in two courses of treatment. As his purulent gonococcal discharge continued he was given twelve intramuscular injections of penicillin. The urethral discharge gradually cleared and no gonococci were seen in smears following. He was returned to duty, but was readmitted sixteen days later. He denied fresh exposure but stated that his discharge had recommenced a few days after leaving hospital and had gradually worsened. On examination he had a thick purulent urethral discharge laden with gonococci.

3·7 c.c. vaccine were given by intravenous drip and the temperature kept above 103° F. for five hours. He was then placed on irrigations for four days. Dry on leaving hospital, urines and prostatic smears normal. He has continued so for the two months he was seen following treatment.

Case 3.—Private K. He had received two courses of sulphapyridine, each of 25 grams, combined with irrigations for three weeks. He was then given twice weekly intravenous injections of T.A.B. vaccine, commencing with 50 million organisms, increasing by 25 million, until a final dosage of 250 million was given. Throughout all this treatment, a profuse purulent discharge, loaded with gonococci, continued.

3·9 c.c. vaccine were given by intravenous drip and temperature kept between 103° and 105° F. for five hours. The patient was dry next morning, urines were clear and remained so while in hospital. He was seen six weeks later, had been free of all symptoms and routine examinations were normal.

Case 4.—Private W. Treated with 28 grams sulphapyridine, followed by 25 grams sulphathiazole. This was combined with p.p. irrigations extending over three weeks.

8·25 c.c. vaccine were administered to this patient. This was followed by irrigations for four days. He was dry on leaving hospital and all tests extending over the next six weeks were satisfactory.

Case 5.—Lance Corporal H. This patient received 28 grams sulphapyridine, followed by 13 grams sulphathiazole. Then given intravenous T.A.B. vaccine injection containing 10 million organisms. A further 25 grams sulphathiazole were given and irrigations extended over the whole period of six weeks treatment. When seen, he still had a thick purulent urethral discharge, loaded with gonococci.

8·25 c.c. vaccine were given and temperature kept above 103° F. for nine hours. Dry next morning, urines clear, and has remained well for five weeks since leaving hospital.

Case 6.—Serjeant-Major P. had had 10 grams sulphapyridine followed by 40 grams sulphathiazole. Combined with p.p. irrigations for three weeks. Heavy purulent gonococcal discharge when seen.

He received 6·25 c.c. vaccine by intravenous drip and temperature kept above 103° F. for nine hours. Dry during remainder of stay in hospital and urines clear. When seen one month later, he had remained symptom-free and all investigations were normal.

Case 7.—Guardsman B. had been treated with two courses of sulphapyridine and one of

sulphathiazole, each of 25 grams. Combined with p.p. irrigations. Urethral discharge consistently loaded with gonococci.

6.25 c.c. vaccine given and temperature kept above 103° F. for ten hours. Dry during remainder of stay in hospital and urines clear. Has kept fit and well for six weeks following.

Case 8.—Corporal P. This patient also had received two courses of sulphapyridine and one of sulphathiazole extending over five weeks. Each course contained 25 grams and irrigations were given concurrently. Profuse discharge had continued all this time and urethral smears contained large numbers of gonococci.

4.3 c.c. vaccine administered and temperature kept above 103° F. for seven hours. Irrigations for three days. On return to duty his urines were clear, no early morning smears available and prostatic smears normal. Was free of any urethral discharge four weeks after leaving hospital.

Case 9.—Lance Corporal B. He had been given 17 grams sulphapyridine followed ten days later by 23 grams sulphapyridine. He then received an intravenous injection of 0.1 c.c. T.A.B. vaccine. Irrigations were given from the outset, extending over four weeks. When seen he had a thick purulent discharge heavily loaded with gonococci. 25 grams of sulphathiazole were given. Still GC.-positive.

4.4 c.c. vaccine introduced by intravenous drip and temperature maintained above 103° F. for nine hours. Dry next morning and remained so during his stay in hospital. Was well and fit when seen six weeks later. Three months after leaving hospital letter received stating he had passed his final tests of cure satisfactorily.

Case 10.—Private B. Two courses were given of sulphapyridine, each of 25 grams, and patient returned to duty, still having a slight urethral discharge. This worsened after a few days and he reported sick again. Smear GC.-positive. Eight grams of sulphapyridine were given in one day, followed by irrigations for ten days. 25 grams sulphathiazole were then administered, combined with two intravenous injections of T.A.B. vaccine of 0.2 c.c. and 0.4 c.c. with a three-day interval between them. Throughout this later treatment, urethral smears were consistently GC.-positive and discharge was profuse and purulent.

7.3 c.c. T.A.B. vaccine were administered intravenously and temperature kept above 103° F. for nine hours. Dry next morning. Kept on heavy trench-digging for two weeks following treatment. All tests normal on leaving hospital and patient has remained so for five weeks following.

Case 11.—Serjeant B. Treated with 28 grams sulphapyridine, 25 grams sulphathiazole, and irrigations. Then intravenous injections of 0.2 c.c., 0.3 c.c., 0.4 c.c. T.A.B. vaccine at three-day intervals. All urethral smears GC.-positive.

8.0 c.c. vaccine were given by intravenous drip and the temperature maintained above 103° F. for six hours. Dry next morning and urines clear. No signs of urethral discharge during stay in hospital and has remained free for four weeks since leaving.

Case 12.—Gunner W. Received 25 grams sulphathiazole followed by a further 30 grams, combined with irrigations for three weeks. When seen he had a heavy urethral discharge, GC.-positive.

5.75 c.c. vaccine were required to keep the temperature above 103° F. for nine hours. The patient remained dry for ten days and then a thin serous bead was obtained on milking the urethra. This consisted mainly of sheets of desquamated epithelial cells with a few pus cells. Placed on anterior urethral p.p. irrigations. For the three weeks the patient was kept in hospital no appreciable change in the microscopic picture occurred. One month after leaving hospital the patient was symptom-free.

Case 13.—Private T. had had gonorrhœa three months ago when he received 25 grams sulphapyridine and was discharged to duty. Since then he had had a thin intermittent urethral discharge which had gradually worsened.

On examination he had a thick muco-purulent discharge in which no gonococci could be seen. Rectal examination—the prostate and seminal vesicles appeared normal. Straight sounds were passed and no evidence of gross folliculitis found. 25 grams sulphapyridine were given. Still purulent discharge, not showing gonococci. On irrigations for two weeks. Morning smears now showed a few gonococci on prolonged search. A repeat course of sulphapyridine was given. He now had a thick purulent discharge containing many gonococci. 25 grams of sulphathiazole were given followed by irrigations for one week. All smears contained gonococci.

4.25 c.c. vaccine were given by intravenous drip. The temperature could not be raised above 103.8° F. and often inexplicably dropped below 103° F. It was kept in the region of the latter figure for eight hours. Morning smears showed many Gram-positive organisms and a few pus cells. He was then treated with p.p. irrigations for one week, and returned to full duty. He was seen twice weekly for the next six weeks. He had no obvious urethral discharge but, on milking the urethra in the early morning, a serous bead could be obtained. This consisted entirely of sheets of desquamated epithelium, probably the result of over-treatment.

Case 14.—Trooper Y. treated with 36 grams sulphathiazole, irrigations for ten days and then a further 28 grams of sulphathiazole. Gonococcal vaccine, 50, 100, 150, and 250 million organisms, was injected at three-day intervals. Then given another 30 grams of sulphathiazole followed by intravenous injections of 0.15 c.c. and 0.3 c.c. T.A.B. vaccine at the same interval. When seen, he had a thick purulent urethral discharge loaded with gonococci. Prostate and seminal vesicles normal.

4.5 c.c. vaccine were given intravenously. No smear obtainable next morning and urines clear. Owing to the exigencies of the Service he was discharged to duty nine days later. This involved an arduous and lengthy journey. Patient noticed a slight urethral discharge while on route and returned to hospital. Urethral smears showed a few gonococci.

The drip was repeated; this time 4.25 c.c. vaccine were used. On both occasions no temperature higher than 103.5° F. could be reached and in place of an even plateau of pyrexia, the chart showed many sudden falls. The temperature was kept around 102° F. for seven hours in both cases. Following the second drip the patient showed a small morning sero-purulent bead containing many pus cells but no gonococci. As he had a very small meatus this was dilated to enable him to take urethral irrigations more efficiently than before. For the three weeks that this case was kept under observation, although urethral smears showed a few pus cells, no gonococci could be detected in urethral or prostatic smears or in spun urine deposits. It was unaffected by the instillation of 0.2 per cent silver nitrate solution.

DISCUSSION.

The treatment of cases of gonorrhœa resistant to sulphonamide therapy constitutes a problem both of social and military importance. On the social side there is the danger of such resistant strains being carried back to England and transmitted to the general population. On the military side, the hospitalization for long periods of otherwise healthy men causes a loss of man-power and a considerable item of expense.

Treatment of such cases by instillations of silver nitrate or argyrol solutions or small doses of gonococcal or typhoid vaccine has not yielded rapid or successful results.

The value of hyperpyrexia has long been appreciated in the treatment of resistant gonorrhœa and its complications. The apparatus required, however, is expensive and difficult to use while the repeated sessions of treatment require a display of fortitude, endurance, and physical fitness not usually found in many patients.

One great value of the method described lies in the fact that it can be carried out in any hospital or clinic. A staff is easily trained to supervise routine details, cases can be treated concurrently, hospitalization is reduced and the method is comparatively inexpensive.

The temperatures attained were not as high or as uniform as could be desired. The conditions under which these experiments took place were such that the occasional mishaps following on high pyrexia could not be tolerated. According to Grüneberg and Liebman (1933) a urethral temperature of 102.2° F. is the minimum necessary to eradicate an anterior urethritis. An oral temperature consistently above 103° F. was therefore considered essential for any degree of success to be attained. Owing to the time lag between the introduction of vaccine and its effect on the thermal centre a perfectly even or regular pyrexia cannot be, and was not, obtained.

That all cases cannot be cured in one session of pyrexia is certain on theoretical grounds, for Ungermann (1919) found that some strains of gonococci resisted a temperature of 105.8° F. for ten hours while a few remained viable even after heating to 125.6° F. for seven hours.

Vomiting and nausea proved troublesome in some cases but was usually controlled by

giving chloral and bromide while the patient was encouraged to drink large quantities of water.

A profuse growth of Gram-positive organisms was often observed following hyperpyrexial treatment. It would appear that the raised temperature, while killing or inhibiting the gonococcus, stimulates the growth of any of the more thermo-stable bacterial flora lying in the urethral canal. In order to prevent their giving rise to a secondary urethritis, urethral irrigations for a few days were deemed advisable.

Most patients developed a marked herpes labialis. This has been observed before, following injection of large or repeated quantities of vaccine, and is an interesting example of the production of a virus lesion by non-specific means.

Since it is held that a general antibody stimulation follows on vaccine therapy it was considered of interest to follow the increase of blood titre. Owing to the pressure of routine work only five cases could be followed. Titres were negative before treatment. Two days later they were still negative. On the third day agglutination was obtained to *B. typhosus* and to *B. paratyphosus B* to 1-800 or greater. By the tenth day this had risen to 1-2,400 or greater. The titres for *B. paratyphosus A* were in all cases very much lower. If gonococcal antibody formation in any way parallels that of typhoid it may play a part in the production of a cure.

The series presented is small but as, under present conditions, facilities for carrying out extensive observations are limited, this work is described in the hope that doctors and venereologists elsewhere may be enabled to investigate the method in greater detail.

SUMMARY.

A method of producing and maintaining hyperpyrexia is described.

Cases of resistant gonorrhœa treated in this way are reviewed and the factors involved in producing a cure are discussed.

ACKNOWLEDGMENTS.

I wish to thank Major D. Priest, Adviser in Venereology, Tunisia, whose encouragement made this work possible.

I take this opportunity of recording the debt I owe to Private S. T. Crockett, my main assistant and helper, who devoted much of his own time to assist me in this work and who, by continual and careful observation, enabled the technique of treatment to be improved.

REFERENCES.

- BALLENGER *et al.* (1937.) *J.A.M.A.*, **109**, 1037.
Idem. (1939.) *Ibid.*, **112**, 1569.
 CARPENTER *et al.* (1933.) *J. Lab. and Clin. Med.*, **18**, 98.
 DESJARDINS *et al.* (1935.) *J.A.M.A.*, **104**, 873.
 GRÜNEBERG and LEIBMAN. (1933.) *Munch. Med. Woch.*, **80**, 1820.
 HEYN. (1942.) *Deuts. Militärärzt.*, **7**, 322.
 MIESCHER. (1940.) *Schweiz. Med. Woch.*, **70**, 621.
 MIESCHER and SCHUTZ. (1940.) *Ibid.*, **71**, 175.
 MORSCHHAUSER. (1942.) *Deuts. Militärärzt.*, **7**, 318.
 ORMOND. (1936.) *J. Urology*, **35**, 551.
 OWEN. (1936.) *J.A.M.A.*, **107**, 1942.
 SIMPSON. (1936.) *N. York State J. of Med.*, **36**, 1290.
 UNGERMANN. (1919.) *Arbeit a.d.k. Gesundheitsamte*, **51**, 180.
 WARREN, SCOTT, and CARPENTER. (1937.) *J.A.M.A.*, **109**, 1430.

GONORRHOEA IN NORTH AFRICA AND THE CENTRAL MEDITERRANEAN

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DURING recent years the lay public, and even members of the medical profession, have come to look upon gonorrhœa as a condition in which "one just takes some tablets for a few days" and all is well.

The danger of such complacency has become increasingly obvious as the campaign has progressed through North Africa into the Latin countries.

While the Army was situated in Algeria and Tunisia the response to chemotherapy ran a course similar to that experienced in the United Kingdom and failures were usually attributable to irregularity of the treatment, insufficient fluid intake through shortage of drinking water in very hot conditions and the hardships of battle resulting in delay in the institution of treatment. In the last category metastatic complications, such as gonococcal arthritis, were common.

Throughout the first months of the campaign sulphapyridine was the drug in general use, administered as a course of 20 to 30 grams in five days. Towards the end of the North African phase sulphathiazole 10 grams in two days was introduced. This was given in forward medical units, as far as possible, to obviate evacuation. While the response to this form of therapy was not so good as the 90 per cent claimed in the United Kingdom the 70 to 75 per cent good results materially conserved man-power and hospital accommodation.

A very different picture presented itself as soon as the campaigns in Sicily and Italy commenced. Forward treatment of gonorrhœa failed almost completely and, as at first the Venereal Diseases Expansions were still with General Hospitals in North Africa, these failed cases had to be evacuated and filled the beds of the expansions which were thus retarded in their movement forward.

A well staffed and experienced V.D. Treatment Centre opened in Sicily and, in conjunction with units of Field Ambulances, endeavoured to stop the need for evacuation to General Hospitals. It was immediately evident that short courses of chemotherapy were useless. Less than 25 per cent were responding and, of these, a large proportion relapsed on the way back to rejoin their units. Dosage was increased to 25 or 30 grams of sulphathiazole or sulphapyridine in four to five days there being, apparently, little to choose between the drugs. Second courses were necessary in 70 to 80 per cent of cases after five to seven days irrigation treatment and, as the battle progressed, with lengthening lines of evacuation, more chemotherapy was given till large numbers of cases reached the main V.D. units still showing gonococci in their discharges after as much as 130 grams of various sulpha drugs.

In these early days there was some irregularity in the administration of the tablets but even when this was rectified the same dismal picture of failure continued. The economic conditions in Sicily and Italy which drove women to prostitute themselves for food and chocolate constituted a menace never encountered by our troops before and the incidence of venereal diseases increased.

As the campaign has progressed northwards in Italy and as expert Venereal Diseases Treatment Units have moved forward there has been a slight improvement in the picture but considerably less than 50 per cent of all acute gonorrhœa responds to an initial course of 25 to 30 grams of sulphathiazole and relapses are common. Irrigations for the succeeding five to seven days followed by a second course of sulphapyridine or sulphadiazine have proved successful in a few cases but recourse to pyrexial therapy by means of intravenous

T.A.B. vaccine during this second course of chemotherapy has become almost a necessity. Some success has followed the use of the standard Army gonococcal vaccine.

Gonorrhœa has become a disease necessitating long hospitalization. Clinically there is a profuse urethral discharge, containing large numbers of gonococci, persisting for many weeks despite the treatment described. Involvement of the posterior urethra occurs early with considerable incidence of prostatitis and epididymitis. Epididymitis frequently occurs when the patient has been in hospital for several weeks, under optimum conditions of rest and treatment, and is usually severe.

Metastatic conditions such as gonococcal arthritis and iritis are rare.

It has been freely suggested that we have met a sulphonamide resistant gonococcus, due to inadequate treatment of the civilian women, but the shortage of the drugs in Sicily and Italy and the complete lack of treatment of infected civilians over a long period makes this theory somewhat unacceptable. The restoration of adequate civilian treatment under the auspices of A.M.G. is progressing rapidly but it is too early to evaluate results.

Rather does it appear that the gonococcus now met is a non-reactor to chemotherapy and, further, that it does not stimulate natural antibody response in the victim.

Venereologists with wide experience in the United Kingdom, North Africa and the Middle East are working together now and none has previously met similar conditions. Our American colleagues have found the same conditions amongst their troops and have had to enlist penicillin as alternative therapy with considerable initial success.

If, throughout Europe, similar difficulties are to be met in the future campaigns, gonorrhœa will be an immense scourge with resultant strain on medical personnel, hospital accommodation and man-power.

SUMMARY.

(1) Since the invasion of the Latin countries gonorrhœa has proved intractable to the former accepted methods of treatment by chemotherapy.

(2) Treatment must be given regularly and prescribed with ingenuity. Adjuvant methods are necessary in a high percentage of cases.

(3) Experienced Venereologists and Special Treatment Orderlies are required in greater numbers than before.

(4) Every endeavour to prevent infection must be increased.

MEDICAL ASPECTS OF PETROL FUME POISONING.

BY MAJOR THOMAS N. RUDD, M.D., M.R.C.P.London,
Royal Army Medical Corps.

PETROL vapour is absorbed by the respiratory and gastro-intestinal mucous membranes. In high concentration it acts as a local irritant producing a chemical pneumonia or an acute gastritis. When absorbed through the respiratory mucosa into the general circulation it acts as a cerebral toxin of an exciting or depressant nature. This latter action is of greater industrial importance than the occurrence of gastritis or chemical pneumonia inasmuch as the effects are produced by much smaller concentrations of vapour and, being in themselves less dramatic, do not lead to an interruption of exposure to the poison. Certain more insidious effects, such as cerebral degeneration, producing a condition similar to chronic (epidemic) encephalitis, are likely to follow more prolonged exposure; dramatic and grave mental upsets resembling acute schizophrenic reactions and the onset of epileptic fits will occasionally be found. These occurrences have led to an investigation of the medical aspects of intoxication by petrol fumes and the methods by which serious effects on health can be avoided. Engineering aspects will be dealt with briefly where necessary.

CONDITION OF EXPOSURE.

In the earlier phases of the war petrol was commonly dispatched to overseas ports in non-returnable 4-gallon petrol cans made of thin metal. These cans were packed in pairs, in cardboard cases, and stacked many layers deep in the holds of freight ships. Unfortunately the cans were insufficiently rigid to prevent collapse of the lower layers under the weight of the superimposed metal and petrol. Whereas the maximum depth for safety was found to be six to eight filled cans, it was often necessary to stack the cans forty deep. As a result of this, crumbling of cans in the lowest layers occurred with the escape of petrol into the hold, sometimes to a depth of two or three feet. Some of this free petrol was absorbed by the cardboard of the containers which was reduced to the consistency of wet blotting-paper. Slow vaporization from this petrol-saturated pulp presented an added difficulty in the ultimate clearing of the ship's holds of poisonous vapour.

METHOD OF APPROACH.

If the petrol loose in the hold could be pumped out by bilge pumps the position would be greatly simplified. Unfortunately the pipes attached to bilge pumps pass through the ship's boiler rooms with consequent grave risk of fire. Furthermore discharge of petroleum into certain harbours is forbidden by local Port Regulations. At the overseas port at which these observations were made the matter was dealt with by men working intermittently in short shifts, as infrequently as possible in the circumstances, no apparatus for breathing oxygen being then available. A man might find himself working twice a week on petrol-shifts of five hours each, during which period he would breathe a petrol-laden atmosphere for up to ten minutes, after which he would rest for twice that period on deck while two successive gangs of his fellows took over. On intervening days he would be employed on duties in a petrol-free atmosphere. Military circumstances, however, often necessitated more frequent exposure. This scheme was found to be most unsatisfactory from several points of view.

MEDICAL RESULTS OF THIS REGIME.

Minor symptoms of head discomfort such as dizziness, headache, ringing in the ears and faintness or a sense of intoxication as from alcohol were almost constant. Actual collapse

with loss of consciousness occurred frequently ; one C.O. reported to me that as many as seven out of twelve men in one gang were rendered unconscious during one five-hour shift. It was frequently noticed that a man, unwilling to leave his post, would sit down in the hope of regaining strength ; he would then pass into a state of stupor from which he could not be roused ; unless carried on deck by his fellows he would sit below until he was fatally overcome by fumes. Some men were so quickly overcome by the fumes that they were unable to reach the bottom of the hold before the poison took effect. In these, the danger of a fall into the ship's hold is very real.

On removal to a normal atmosphere immediate recovery occurred both in stuporose and exhilarated subjects. Both reactions were, however, followed by a secondary deep sleep or stuporose stage from which the workers could be aroused with difficulty to undergo exposure for the second or third time. It was not found possible to spare a man from further exposure to fumes on that morning even though he might have been overcome by unconsciousness more than once earlier in the day.

Several lay observers have commented independently on the aspect of men leaving the polluted atmosphere. They describe a staring visage with ashen-grey colour, staring eyes with the eyeballs turned upwards and a muscular spasm of the hands, usually flexor in nature. One officer related how he himself experienced this uncontrollable tonic contracture of his hands on leaving the vapour atmosphere. Vomiting was frequent when outer air was reached. An unpleasant taste remained in the mouth for hours—some officers noted that their men were unfit for hard work for twenty-four to forty-eight hours afterwards. These symptoms, unpleasant as they may be, are however transient. In importance they are outweighed by certain more lasting abnormalities. Many men commented on character changes in their friends who inhaled petrol vapour ; a previously cheerful companion often became morose and sullen. Most dramatic of all was one case of acute psychosis in a man described to me by his C.O. as being previously a good reliable worker with no character abnormality. His past medical history was healthy and there was no familial mental disease.

Case 1.—W. A. R., aged 24, a sapper in a Docks Operating Coy., had been working for some weeks in a heavily contaminated atmosphere, sometimes in shifts twice weekly and sometimes for days on end. On January 20, 1943, he lost consciousness in the hold and had to be brought up on deck. On February 1, while in the hold breathing petrol, he began to behave abnormally, running round the set with an axe. He was immediately helped up the ladder but collapsed on the way, and fell six feet on to his heels. He apparently recovered after breathing pure air and was passed by a Medical Officer as being in no danger although unfit for work. On waking from his secondary stupor during the afternoon he was in an agitated frame of mind with hallucinations of an incessant voice saying, "Hurry up—hurry up." After a disturbed and restless night he was admitted under me into a Military Hospital on the morning of February 2 in a fully hallucinated state, the diagnosis being Acute Schizophrenia. He was transferred on February 4 to a Base Hospital for mental observation with little improvement in his mental condition. A full investigation in that Hospital failed to show any evidence of lead intoxication. Schizophrenic phases alternated with periods of acute anxiety and, in this alternating state, he was ultimately evacuated to U.K. The association of cause and effect appears very clear.

The muscular spasm experienced by some men on leaving the polluted atmosphere suggests that petrol vapour is an epileptogenic substance and that exposure to it may bring to light a latent tendency to epilepsy or reactivate a quiescent epilepsy. The following case, in which association between cause and effect is far less clear and perhaps doubtful, may illustrate this point :—

Case 2.—L. P., aged 21, a sapper, had a short exposure to petrol on January 5, 1943, his one and only experience, developed adverse symptoms and had to leave the set. He was unwell following this and was admitted to a Military Hospital on January 8. During his stay there he described a sensation, typical of minor epilepsy, which had never been experienced before. Since then he has had several absolutely typical minor attacks, witnessed in hospital. There is a strong constitutional tendency to epilepsy as witnessed by the family history.

It is still much too early to anticipate late results of chronic exposure to petrol fumes but analogy with other intoxications, such as with manganese and the exhaust-fumes of motor cars, coupled with the character change and moroseness described by witnesses, suggests that these men are liable to that most distressing condition of neuronc degeneration known as Parkinson's Disease so often seen as the late-effect of epidemic encephalitis.

AVOIDANCE OF ILL-EFFECTS ON EXPOSED PERSONNEL.

No one is more aware of the need for the protection of dock personnel than Officers Commanding Docks Operating and Pioneer Companies who have found themselves forced to employ soldiers in conditions of work which are economically unsatisfactory and highly dangerous to health. Various methods of overcoming the difficulties have been tried. These include the following, ranged in descending order of success: (a) The employment of the Smoke Hood, such as used by Pioneer Companies carrying out smoke screen work, the hood being connected with a rubber tube of 1 to 1½ inch bore leading to the outer atmosphere. These hoods are often difficult to obtain during active operations. R.E. officers estimate that a man can work in safety for twenty minutes wearing this hood, after which time he is forced to rest through heat-exhaustion. (b) Use of bilge pumps; this is highly dangerous and furthermore contravenes Port Regulations by contamination of the sea with oils. (c) Replacement of atmosphere by pumping in compressed air or steam or more simply by the use of a canvas wind sail which directs the prevailing wind, through a canvas tunnel, into the ship's hold. Attempts at ventilation are however unsatisfactory for three reasons: (1) Air, being lighter than petrol vapour, rapidly rises to the top, washing out with it only a small quantity of poisonous fumes. (2) As with all heavy gases, pocketing in corners and in closed spaces tends to occur. These spaces are not easily reached by pumping in compressed air. (3) Once the atmosphere is cleared, rapid vaporization from free petrol once more renders the atmosphere highly polluted. (d) Use of selected (tolerant) personnel; observers agree in the marked variation in the tolerance to petrol vapour shown by different subjects. The use of personnel which has been found to tolerate the fumes well and the exclusion of all who have once experienced toxic symptoms is precluded by the shortage of personnel for work of the utmost military priority.

OCCURRENCE OF TOXIC EFFECTS UNDER OTHER CONDITIONS.

While poisoning by petrol fumes of stevedores working in the holds of petrol ships is the most common cause of symptoms, exposure may occur under other circumstances from bulk-stores on the lines of communication. Dermatitis among exposed personnel is common. A Surgeon Lieutenant, R.N.V.R., encountered the cerebral effects under the following unusual circumstances:—

During 1940, a naval vessel in the South Atlantic was summoned to the aid of a petrol-tanker which had been split in two, but not set on fire, by enemy action. The atmosphere around the sinking ship was heavily charged with petrol while a layer of petrol covered the surface of the ocean. As the rescuers approached the damaged vessel a lifeboat was sighted, bearing merchant navy personnel, many of whom were singing uproariously and behaving in a drunken manner. Some had sunk in stupor in their seats while the heads of others had rolled over the gunwale of the overladen boats so that they were drowned as they sat. The crew had had no access to alcohol and acute alcoholism could be excluded. Many of the rescuing personnel complained of headache on leaving the petrol-laden atmosphere.

The occurrence of a chemical pneumonia by direct inhalation of liquid petrol is illustrated by the following case history:—

Case 3.—Serjeant J. R. W. was admitted to a military hospital at 23.00 hours on 27.12.42 with a history of having swallowed and inhaled liquid petrol through a blow-back from a carburettor which he was cleaning at 17.30 hours that evening. He was seen immediately by a M.O. who found him collapsed and cyanosed and complaining of upper abdominal

pain. At 20.15 hours, in spite of stimulants, he was still in a collapsed state ; there was respiratory distress with expectoration of red frothy sputum. On admission to hospital he was still distressed and excitable. A few crepitations were heard in both lungs. The temperature was 100° F. The following day he had a maintained fever of 101° F. with extensive crepitations in both lungs. The temperature had settled by the sixth day and, by the tenth day, the chest was free from abnormal signs. He returned to light duty on the fourteenth day.

Direct access of liquid petroleum or of a high concentration of fumes to the skin leads to drying and cracking of the epithelium. Secondary infection readily occurs. Unless this is prevented by scrupulous cleanliness, and the application of a cream composed of one part of lanoline and two parts of olive oil to the exposed skin, much loss of time from cutaneous sepsis is likely to occur.

GENERAL OBSERVATIONS.

- The ill-effects from exposure to petroleum fumes, as recorded above, tally well with previous observations under industrial conditions. The ill-effects produced under conditions of active service should, however, be strongly emphasized and borne in mind by medical officers and officers of technical and pioneer units whose personnel handles petrol.

The only satisfactory method to avoid highly dangerous exposure of workers in ships' holds is the use of an oxygen apparatus worn on the worker's back. If it should ever be necessary again to export petrol, in the manner described earlier, oxygen masks should if possible be provided for the use of docks-operating companies engaged in unloading.

Conditions of active service made estimations of concentration of petroleum vapour in ships' holds impossible. For the same reason routine estimation of lead absorption could not be carried out except in Case 1 where the base hospital reported " Investigation failed to show any evidence of lead intoxication so that the tetra-ethyl lead in the petrol can hardly have been a causative agent."

SUMMARY.

The ill-effects arising from exposure to high concentrations of petroleum vapour under conditions of active service are discussed. Methods of combating them are described and the need for portable oxygen apparatus for use of personnel working in ships' holds, where dangerous concentrations may be found, is stressed.

It is suggested that the serious toxic effects of petrol fumes is at present insufficiently appreciated by officers in medical charge of exposed personnel.

My thanks are due to Major C. Kenton, R.A.M.C., for help with Case 1, and to Lieutenant-Colonel Roy R. Grinker, U.S. Medical Corps, for useful criticism.

REFERENCE.

"Toxicity of Industrial Organic Solvents" (M.R.C.), 1937, H.M. Stationery Office, 89.

POST-MORTEM APPEARANCES IN BATTLE CASUALTIES.

BY CAPTAIN A. P. PRIOR,

Pathologist to a Military Hospital.

Royal Army Medical Corps.

DURING recent military activity opportunity was found in this hospital to make as full post-mortem examinations as possible on a series of battle casualties. This was done at a time when the hospital was tactically well situated for the early reception of such cases. During two consecutive months seventy-three post-mortems were done ; thirty-two of these were battle casualties. Burns cases accounted for seven ; twenty were accidental injuries ; other surgical conditions yielded four and medical conditions ten.

The hospital at which they were received exercised a complete impartiality with regard to the origin and type of case taken. It was conveniently close to Field Medical Units so that cases could be received which would not have withstood a longer journey. Special facilities also existed for dealing with maxillo-facial and burns cases. It is thus thought that the series presented will offer a reasonable cross section of the acute type of case which results from modern desert warfare.

In this survey the cases are listed as much as possible under the anatomical site that had aroused the greatest efforts of the clinicians. Where another injury or the extent of complicating factors was disclosed at post-mortem, this is indicated. Attempts are made to reconstruct the processes involved clinically. Some generalizations are indulged in where the numbers seem to justify them.

SKULL WOUNDS.

Battle casualties coming to autopsy as a result of skull wounds without gross trauma elsewhere were reasonably rare. There were five such cases in the total series. In these the most common type of injury seen was a fracture of the vertex to one or other side of the mid-line. Although all these cases had been afforded surgical treatment in Field Medical units suppuration had set in and intracranial hæmorrhage was the terminal event. In more than one of these the possibility of wound by a blunt instrument was canvassed.

MAXILLO-FACIAL INJURIES.

Maxillo-facial cases provided a few deaths. The majority of these were from readily understandable complications. One case, who had sustained a wound of the jaw which penetrated to the tongue, succumbed to pleurisy, pneumonia and pericarditis of pneumococcal origin. A second case had sustained a wound in the occipital area where it was well hidden by skin and hair. The missile had travelled through the lateral aspect of the posterior cranial fossa sufficiently to cause fragments of bone to be pushed into the cerebellum. It had crossed thence to the mouth area, caused a fracture of the lower jaw and done considerable damage within the mouth itself. The cerebellum had reacted normally to the presence of bony spicules in that an abscess cavity was present. Pulmonary œdema had been the terminal event.

The remaining cases of the maxillo-facial group were rather less illustrative. Pneumonia accounted for its quota. In one case, where the wounding not only involved the jaw but had also penetrated the cheek and antrum, it had disrupted the submaxillary gland. Extensive hæmorrhage into the tissue planes of the neck was not controlled by surgical or resuscitative measures. Respiratory embarrassment and hæmorrhage accounted for this death.

WOUNDS OF THE LIMBS.

There were two cases of wounding of the limbs which succumbed. One of these was a penetrating wound of the thigh with fracture of the femur. This behaved in a traditional if

slightly old-fashioned manner by developing and dying of a lobar pneumonia. One case of gas gangrene occurred in the whole period. This patient sustained wounds of the arms and legs. Gangrene developed in both. In spite of radical surgery and local and general specific therapy the infection was overwhelming. Clostridia were isolated from the wounds and stumps as well as from the liver and spleen. The post-mortem appearances were typical.

BURNS.

Seven cases of burns came to autopsy during this period. The problem of the exact mode of death in these days has been largely debated. In those who do not develop a definite morphological abnormality, such as pulmonary oedema, bronchopneumonia, myocarditis or extensive sepsis, the principal changes are found in the liver. To these are added certain less well-defined and described changes in the duodenum and suprarenals.

It is hoped to add to an already extensive literature by a communication at a later date of which these cases form part of the material. It will suffice to remark that the major changes in the liver as described by Wilson and his co-workers were present in these cases. This is a diffuse yellow degeneration of the liver with interference with the lobular markings.

In cases dying about one hundred hours after injury the liver is soft, yellow and greasy. The centre of the lobule can usually be appreciated as pallid. With more marked toxæmia disorganization is more pronounced.

No case of classical Curling's ulcer was encountered. The possibility of the inhalation of flame could not be confirmed in this series. No macroscopic suprarenal hæmorrhages were found. No fault was found with the general appearances to suggest that there had been any sparing hand with the administration of appropriate fluids.

WOUNDS OF THE ABDOMEN.

Only a small number of cases of wounds of the abdomen came to autopsy at this site. In this series either the wounding agency or the complications were diverse. Five cases are listed under this series.

One case was wounded close to the hospital and admitted *in extremis*. Massive transfusions were given and an heroic attempt at surgery involving the removal of the spleen and left kidney was made. A temporary improvement resulted but was not maintained. At autopsy a missed rent of the splenic flexure was found. This had resulted in the escape of bowel content. Gross suppuration and intraperitoneal hæmorrhage were present.

Three cases of abdominal wounding resulting in suppuration came to autopsy. All had been operated upon before receipt. In two, in addition to many and extensive repairs of wounded bowel, a segment had been exteriorized. In both gangrene of the exteriorized segment had set in and been followed by general peritonitis. The third presented a large renal abscess which communicated with the perinephric tissues but drained only a little to the exterior. The post-mortem appearances were those of suppuration of some standing. Amyloid degeneration was not present.

Wounds of the liver were most common in association with wounds involving the thorax. They will be dealt with under that section.

WOUNDS OF THE THORAX AND ABDOMEN.

Sixteen cases were encountered in which wounds involved the abdomen and the thorax. In the cases that thus came to autopsy it appeared that the general direction of missiles was from above downwards. There was but one case which showed abdomino-thoracic type of injury. There was one in which separate wounds had occurred in the abdomen and thorax. In three cases the thorax alone was wounded. Contrasted with these were eleven cases in which the missile entered the thorax and penetrated to the abdomen. It seems a reasonable inference that this type of injury is one of the most likely to be rapidly fatal.

The one case that showed abdomino-thoracic injury had been wounded some days before

reaching hospital. Adequate resuscitation had been done. At operation a foreign body had been removed. At post-mortem a subphrenic abscess was found. A track had been ploughed through the right lobe of the liver. This was of some standing and showed a central cavity surrounded by an area of necrotic tissue. This was in turn surrounded by an area of whitish condensed tissue. Without this again was an area of hyperæmia. The wounds of the thorax had resulted in pyothorax. At least one loculus showed gas under tension. This thorax was notable for the florid amount of lymph produced and the evidences of infection. In this particular instance the rent in the diaphragm was walled off by inflammatory reaction.

The one case that showed separate abdominal and thoracic types of injury had received adequate resuscitative treatment, laparotomy and repair and chest aspiration. At autopsy bilateral pyothorax was found. Pyogenic reaction was pronounced along the diaphragmatic aspects of the lungs. In the abdomen there were large numbers of adhesions of great variety of attachments and thicknesses. A large abscess cavity was present in the left upper quadrant. It was fairly well walled off. It was of irregular shape and was bounded in front by the posterior aspect of the transverse colon, laterally by the spleen and left kidney. It ran across the surface of the pancreas and then posteriorly so that it then extended up and down anterior to the transverse processes of the vertebræ. Peritoneal adhesions had formed just distal to the splenic flexure so that a condition of subacute intestinal obstruction existed.

The clinical reconstruction of this case appears to be that the penetrating missiles, although not damaging any viscus, carried in infection which proved gross and resistant. Natural reparative processes accounted for the intestinal obstruction.

In the present series deaths from wounds involving the thorax and abdomen were the most common. Not infrequently there was but one wound present and that a sucking wound of the thorax. This was treated on its merits.

The advent of abdominal symptoms seems to have been very gradual although a study of the notes coming with these cases shows careful clinical record of the condition of the abdomen.

At autopsy the changes found in addition to trauma differed, first, on the amount of hæmorrhage and effusion into one or other serous cavity and, secondly, on the advent of sepsis. The balance has to be struck between those embarrassments caused mechanically and those caused by infection.

In only one case in the present series did the omentum appear to do its duty really properly. In this a rent of the diaphragm was firmly and adequately plugged by a tongue of omentum. Abdominal lesions were minimal.

Bronchopneumonic consolidation in the lung of the unaffected side was one of the most common complications. It occurred in no less than four of these cases. In addition the lung of the unaffected side tended to run with œdema fluid on section.

The natural consequences of penetration of the chest by a missile would of course have been hæmothorax with greater or less collapse of the lung and displacement of the mediastinum. In nearly every case, particularly when there was either a larger chest wound or appreciable abdominal damage, infection had been added. In some cases also pneumothorax had developed.

The presence of blood in the pleural cavity is a stimulus for the outpouring of pleural fluid. In early cases the fluid found in the pleural cavities is slightly diluted blood. Fibrin thrombi are present on walls in relation to the wounds. In later cases where infection is established the liquid is foul-smelling and discoloured. There has been lymph production and pyogenic membranes have formed. Reparative processes are almost always apparent in relation to the track of the missile. In some instances of gross suppuration in the pleural cavity the original track could not be demonstrated.

Evidences of infection within the peritoneal cavity were slight in comparison with those within the thorax. Damage to abdominal organs was not marked in many cases with the exception of wounds of the liver.

No less than five of these cases showed liver wounds. It appears that such wounds may be very large without being lethal. In these cases it was the right lobe that suffered.

In general a central track existed. This was surrounded by an area of necrosis and this in turn by an area of whitish condensed fibrotic tissue. The extent of the fibrotic reaction and of hyperæmia without this depends on the age of the wound. Most recent liver wounds show least central necrosis and a less amount of fibrosis.

One case of liver wound had a wound of the kidney also. This was accompanied by peritoneal and thoracic hæmorrhage and bronchopneumonia.

Of the cases under review four showed bronchopneumonia as a terminal phenomenon and four deaths were due to sepsis. Of the remaining cases one, in addition to showing hæmopyo-pneumo-thorax, had acute dilation of the stomach.

All cases, of course, had other injuries. Wounds of the lungs themselves seem to have been adequately controlled by the hæmorrhage they had occasioned. The exception was a case in which the wound and the track had become infected, the condition in the wounded lobe becoming infected and resembling an abscess cavity.

Two cases showed herniation of abdominal contents through the diaphragm. In these the herniated viscera took part in the general septic change within the thorax.

ACKNOWLEDGMENTS.

My thanks are due to Lieutenant-Colonel R. K. Debenham, *O.B.E.*, *R.A.M.C.*, for encouragement and permission to use clinical notes.

I owe a particular debt to my Laboratory Assistants, Serjeant E. Shearman, *R.A.M.C.*, Private J. Barratt, *R.A.M.C.*, and Private K. Dennis, *R.A.M.C.*, not only for their assistance with these post-mortems but for their general excellence and high morale in this busy time.

TWO CASES OF INFECTIVE MONONUCLEOSIS.

BY MAJOR J. MACKAY-DICK,

*Royal Army Medical Corps,**Medical Specialist.**Case A.*—No. 6849637 Rifleman J. J., aged 24. Service four years.

Admitted to No. 13 General Hospital on January 10, 1944.

Complaint.—Fever (T. 101.4° F., P. 120). Painful and tender discrete enlargement of cervical, axillary and inguinal glands. Febrile for three days. No rash. Spleen not palpable. Atrophied painless left testicle. Spermatic cord L.N.A.D. Painless enlargement of right testicle. This painless enlargement has been progressive since August, 1943. Size of right testicle has not increased in hospital. Nil abnormal noted in epididymis, right, or in spermatic cord, right.

Foreign Service.—Two years (Egypt, Cyrenaica, Tripoli).

Previous illnesses.—"Tonsillitis," July, 1943. Short term febrile illness (2-3 days fever) called "sandfly fever," July, 1943. NB. Complaints *re* testicles began early in Aug., 1943, following these "two illnesses" which I believe are merely the early stage of his present illness which would appear to be glandular fever (infective mononucleosis). He has also had malaria, B.T., on two occasions.

No history of mumps, venereal disease or of any previous disease of his genito-urinary system. No history of trauma to testicles.

Investigations carried out :—

10.1.44 : R.B.C. 5,400,000/c.mm., Hb. 102 per cent ; W.B.C. 9,600/c.mm. : Polys 35 per cent, lymphos 50 per cent, monos 15 per cent, eosinos 0 per cent.

12.1.44 : Paul Bunnell reaction, "Specimen hæmolysed sheeps' cells." Urine, N.A.D.

19.1.44 : R.B.C. 4,710,000/c.mm., Hb. 95 per cent ; W.B.C. 8,200/c.mm. ; Polys 45 per cent, lymphos 50 per cent, monos 4 per cent, eosinos 1 per cent.

25.1.44 : B.S.R. 3 mm. in one hour (Westergren).

31.1.44 : W.B.C. 14,600/c.mm. : Polys 51 per cent, lymphos 38 per cent, monos 11 per cent.

3.2.44 : Paul Bunnell reaction, serum 1 in 128, control 1 in 16.

13.2.44 : W.B.C. 8,600/c.mm. : Polys 69 per cent, lymphos 26 per cent, monos 3 per cent, eosinos 2 per cent. B.S.R. 6 mm. in first hour (Westergren).

Kahn reaction, negative.

Paul Bunnell reaction, serum 1 in 4, control 1 in 4.

Gonococcal Complement Fixation Test : Negative.

Midstream urine, culture sterile. Micro, N.A.D.

Seen and passed by venereologist.

Treatment has consisted of rest in bed and a suspensory bandage as support for the testicles. The condition of the right testicle and right epididymis is I.S.Q., otherwise the patient is well. Hospitalized for thirty-six days.

The case is believed to be one of relapsing infective mononucleosis which started in July, 1943, when he was diagnosed as having tonsillitis and later sandfly fever, and which was complicated by orchitis or probably epididymo-orchitis early in August, 1943. It has now resulted in complete atrophy of the left testicle, probably epididymis as well, and a stationary enlargement of the right testicle which may or may not atrophy just as its neighbour.

It is of interest to record that the involvement of the testicles and probably epididymis as well has been painless throughout.

I consider the case to be one of epididymo-orchitis complicating infective mononucleosis (glandular fever). It may be similar to the cases of non-specific epididymitis which have been reported in the past.

The Paul Bunnell reactions were carried out in the Central Pathological Laboratory.

Case B.—No. 201704 Sapper G. S., aged 28. Service four years.

Admitted to No. 13 General Hospital on January 7, 1944.

Complaint.—Dull pains across lower abdomen for fourteen days. No nausea or vomiting. Sent into hospital as ? appendix. T. normal, P. 72.

Examination revealed the right testicle to be much enlarged and tender on palpation with slight tenderness of the associated epididymis. Right spermatic cord shows nil abnormal. Abdominal pain not relieved by supporting the testicles. The left testicle, though much smaller than its enlarged and tender neighbour, appeared to be of a reasonably normal size and testicular sensation did not appear to be abnormal. No rash. Spleen not palpable. No obvious lymphglandular enlargement.

Foreign Service.—10/12 years (Tunisia, Algeria, Egypt). No illnesses during this period.

Previous illnesses in U.K.—"Tonsillitis" and also coryza. No history of mumps, venereal disease or of any previous disease of his genito-urinary system. No history of trauma to testicles.

Results of investigations :—

14.1.44 : Urine, N.A.D. B.S.R. 5 mm. in one hour (Westergren).

3.2.44 : W.B.C. 8,600/c.mm. : Polys 59 per cent, small lymphos 29 per cent, large lymphos 3 per cent, monos 8 per cent, eosinos 1 per cent. Paul Bunnell reaction, serum 1 in 512, control 1 in 16.

13.2.44 : W.B.C. 7,000/c.mm., Polys 66 per cent, lymphos 5 per cent, eosinos 1 per cent. B.S.R. 8 mm. in first hour (Westergren). Kahn reaction, negative. Paul Bunnell reaction, serum 1 in 4, control 1 in 4. Midstream urine, culture sterile ; micro N.A.D. Gonococcal Complement Fixation Test, negative. Seen and passed by venereologist.

Although this patient has been afebrile since admission, which was fourteen days after the onset of the symptoms, and showed no obvious lympho-glandular enlargement I consider that there is sufficient justification for considering him to be suffering from infective mononucleosis. It is regretted that a white blood count and a differential count was delayed until the middle of the fourth week following the onset of symptoms but even then the differential white count at this stage is suspicious whilst the result of the Paul Bunnell reaction would appear to be diagnostic. There is no doubt about the marked enlargement of the right testicle. The left testicle may or may not have been similarly involved and it may be that it is becoming smaller just as the left testicle in Case A. The lower abdominal pains may have been due to involvement of the *mesenteric* glands.

It is considered that the epididymo-orchitis in this case is a complication of infective mononucleosis (glandular fever).

The Paul Bunnell reactions were carried out in the Central Pathological Laboratory.

COMMENTARY.

In five years' service in Egypt, the Anglo-Egyptian Sudan, Eritrea, Syria and Palestine it has been my good fortune to have seen a few cases of infective mononucleosis (glandular fever) in each of these countries.

The disease would appear to be as ubiquitous as infective hepatitis. In infective mononucleosis I have been struck by the relative frequency with which one has elicited a long history indicating that the disease process started months before and was characterized by a short term febrile phase with sweating, general malaise, aches and pains and weakness with or without complaints of sore throat or painful and tender lymph glands in the neck, etc.

These febrile bouts have recurred at intervals and have been given such diagnoses as "pharyngitis," "tonsillitis," "P.U.O.," "sandfly fever," "influenza" or, as happened in the case of a pathologist who subsequently became a colleague of mine, "atypical relapsing fever," before these patients were observed in hospital and *repeated* blood counts were carried out well into the afebrile phase of the illness and the true diagnosis established. In this connexion it is emphasized that unless differential white blood counts are done repeatedly at intervals of a few days many cases of infective mononucleosis will be missed because the differential white blood counts may be within normal limits, for some days at least, after a

febrile phase and in the meantime the patient is discharged from hospital with one of the diagnoses already mentioned.

I have seen so many cases of infective mononucleosis diagnosed, as it were, by accident that I am convinced that the apparent incidence of this disease is by no means indicative of its true incidence. As infective mononucleosis is usually a mild, though prolonged and weakening, illness it must be overlooked on frequent occasions, more especially as the patient has probably been discharged from hospital before characteristic changes occur in the blood picture.

Of course cases which present extensive lympho-glandular enlargement and/or a rash are less apt to be missed than cases resembling simple sore throat or a short term febrile illness such as sandfly fever because a thorough examination of the white cells is usually carried out in all cases with lympho-glandular enlargement or with a rash; in such cases a Paul Bunnell reaction would also be considered a relevant investigation.

It may be of interest to record that I have heard medical officers talking about cases of sandfly fever with glandular enlargement !

Furthermore, as regards the varied symptomatology of infective mononucleosis (glandular fever), I know of two proven cases, one of which exhibited enlargement of the thyroid gland and both showed loss of weight, listlessness, lack of energy, sweating, irritability with mild emotional instability and which were diagnosed as thyrotoxicosis and "goitre" respectively. Subsequently the diagnosis of infective mononucleosis was established beyond doubt. I am not aware that the thyroid gland has ever been involved in glandular fever but it is an interesting idea.

Case A would appear to be a typical case of infective mononucleosis beginning in early July, 1943. The first period with symptoms was called "tonsillitis," the second period with symptoms was called "sandfly fever" and then, early in August, 1943, he noted changes in his testicles which were insidious in onset and which were painless, progressive and persistent and probably permanent.

He finally reported sick on January 10, 1944, and had a three-days' fever with extensive lympho-glandular enlargement but no rash. The diagnosis in this case would appear to be beyond doubt. In addition most causes of the epididymo-orchitis type would appear to have been excluded.

Case B is of marked interest because there is no evidence of fever, superficial lympho-glandular enlargement or of a rash. The lower abdominal pains, believed to be due to involvement of the mesenteric glands, resulted in the patient being admitted to hospital as " ? appendix " whilst the obvious right epididymo-orchitis scarcely attracted the patient's attention although he is well aware of it now.

The symptomatology of these cases of infective mononucleosis must emphasize how vague the appearances of this disease can be.

SUMMARY.

(i) Two cases of infective mononucleosis (glandular fever) with epididymo-orchitis are described.

Case A shows complete atrophy of the left testicle and a painless progressive enlargement of the right testicle the rate of which the future will show.

Case B has a tender right epididymo-orchitis with obvious enlargement of the right testicle. The left testicle may be becoming smaller. The future will decide the rate of subsidence of these testicles.

(ii) Case B was sent into hospital as " ? appendix " because of lower abdominal pains. Case A had been diagnosed as "tonsillitis" and then "sandfly fever" at the apparent onset of his illness and was finally admitted to No. 13 General Hospital as a case of P.U.O.

(iii) No rash or splenic enlargement in either case. No obvious lympho-glandular enlargement in Case B but glands prominent in Case A.

(iv) The blood picture and Paul Bunnell reactions in each case indicate infective mononucleosis.

(v) Both cases show: Normal B.S.R., negative Kahn reaction and G.C.F.T., sterile normal urine, no history of trauma, mumps, venereal disease or of any other disease of the genito-urinary system.

(vi) The mildness of the symptoms referable to the external genitals, their insidious onset and their obvious gravity, are most striking.

CONCLUSIONS.

(i) Two cases of epididymo-orchitis occurring as a complication of infective mononucleosis are described. This complication, insidious in onset and with relatively mild symptoms, can result in complete testicular atrophy and must be regarded as being very serious especially if both testicles suffer. The future will show whether or not both patients will have unilateral or bilateral testicular atrophy.

(ii) In all cases of epididymo-orchitis or epididymitis of vague origin, investigations for infective mononucleosis should be carried out and, what is important, repeated at intervals.

(iii) In the early stages infective mononucleosis may be missed completely and called P.U.O., influenza, pharyngitis, tonsillitis or sandfly fever, especially in the absence of a rash, absence of obvious lympho-glandular or splenic enlargement, because blood changes may not occur till later on in the disease and until the febrile phase is well over.

(iv) Case A is an example of infective mononucleosis, frequently called relapsing infective mononucleosis, which smoulders insidiously and unsuspected over a period of several months with mild febrile exacerbations before the clinical picture arouses suspicions regarding the true nature of the illness.

(v) Infective mononucleosis should be kept in mind in connection with all patients who exhibit recurring bouts of short-term fever with weakness, lassitude, sweating and a feeling of "out of sorts" or of being below par.

(vi) Complete testicular atrophy with loss of function may result from epididymo-orchitis occurring as a complication of infective mononucleosis. This is a serious complication, especially if bilateral, and the question of this disability, contracted in the tropics or sub-tropics, being regarded as directly attributable to Military Service should receive attention and an official decision be made.

(vii) It is suggested that infective mononucleosis, which is believed to be due to a virus, is an infective disease in which changes in the differential white blood count are not constant features and that when such changes occur their time of appearance may be delayed considerably.

Accordingly it is suggested that the Paul Bunnell reaction may be a more frequent investigation in cases of vague ill-health or in cases with recurring bouts of short-term fever with normal B.S.R. and where the cause is not obvious.

(viii) Attention is drawn to the varied clinical manifestations of infective mononucleosis and to the various diagnoses which may be inadvertently applied to it. These seem to include disorders of the thyroid gland.

ACKNOWLEDGMENTS.

Major-General W. C. Hartgill, *O.B.E.*, *M.C.*, *D.M.S.*, Middle East Forces for permission to forward this paper.

Colonel C. M. Forster, Commanding No. 13 General Hospital, for permission to forward these notes for publication.

No. 7356404 Quartermaster Serjeant H. J. Wilding, *R.A.M.C.*, for his prompt and ready co-operation in typing these notes for me.

Editorial.

SULPHONAMIDE RESISTANT GONORRHŒA.

WITH the advent of the sulphonamides many of us thought that we had at last found a panacea for gonorrhœa—something which approached the *therapia magna sterilisans* of which Ehrlich dreamed. Though sulphanilamide as used in the early days was only successful in about 50 to 60 per cent of cases, sulphapyridine appeared to cure over 80 per cent, whilst many reported a cure rate of up to 95 per cent with sulphathiazole or sulphadiazine ; moreover the last two were free from many of the objections, i.e. side reactions, which made sulphapyridine objectionable to patients. Everyone is familiar with the extreme optimism which greets each epoch-making new remedy—and few will deny that the discovery of the sulphonamides was epoch making—yet the more sceptical were not surprised when a proportion of cases of gonorrhœa failed to clear up under simple chemotherapy. Nevertheless very high cure rates were reported from all quarters, complications became comparatively rare, relapse rates dropped and gonorrhœa in the majority of cases ceased to be a serious disease ; so much so that, in the British Army, and in the American and Canadian Forces in this country as well, it was found practicable to treat cases either in their own units or in minor medical establishments or, as the Americans put it, “ on a duty status,” ; that is to say most cases did not need to be treated in hospital. This was a great advance since it saved a large amount of transport and many hospital beds whilst the soldiers’ training was little, or not at all, interfered with ; admittedly civilians had almost always been treated as out-patients, even in pre-sulphonamide days, but they had usually been treated by specialists and living and other conditions are very different in civil life from those in the Army. Whereas the average soldier with gonorrhœa during the last war spent something like fifty to sixty days in hospital now he could be cured out of hand in a few days without leaving his unit and, in fact, in many cases without being away from duty at all.

There has been a feeling for many months now, however, that results are not as good as they had been, and that the percentage of cures is falling ; this was well brought out in a paper read before the Medical Society for the Study of Venereal Diseases on April 28 last when very large numbers of cases were analysed. We had all met cases which proved partially or, more rarely, totally resistant to chemotherapy but, up to quite recent times, these numbers had been comparatively small and only the odd case gave real cause for worry. With the advent of the Sicilian and Italian campaigns, however, the whole picture changed almost in a night. It quite suddenly became clear, as shown in an article appearing elsewhere in this Journal, that not only were we not reaching an 80 or even 70 per cent cure rate but that frequently it fell to 25 per cent or even lower. At first it was thought that the difficulties of treatment under field conditions were responsible—treatment by inexperienced medical officers, rapid movement of troops, inadequate and irregular dosage, adverse climatic and other conditions ; it was even suggested in this connexion that many samples of the drugs used were lacking in potency ; but the manufacturers scouted this idea and few to-day believe it to be an important factor.

Sulphonamide resistance may be partial or complete ; the former is much commoner and such cases usually clear up with simple adjuvant treatment ; the latter is much more of a problem. No doubt the former accounted for a proportion of cases in Italy, but a relatively small one ; large numbers of cases proved completely intractable—the discharge persisted in spite of sulphonamides being given in all sorts of dosage, numerous gonococci could be found in every smear examined and such complications as littritis, para-urethritis, peri-urethral abscess, prostatitis and vesiculitis were common though, curiously

enough, metastatic complications such as arthritis, iritis, etc., were comparatively rare. In fact the reaction of the disease to treatment seemed to be no better, or even worse, than it was twenty or thirty years ago and frequently the sulphonamides appeared to have no effect whatever.

It is of interest to speculate on the cause of sulphonamide resistance ; assuming the drugs are of standard potency the explanation must lie either in the organism or in the patient or in the effect of the one on the other. It has been shown by *in vitro* experiment that some strains are more resistant than others, some in fact being completely unaffected by the drug ; some strains appear to be naturally resistant whilst others acquire resistance, possibly as a result of gradually developing immunity following sublethal doses of the drugs, just as the body develops resistance from small repeated doses of vaccines. The former will probably prove resistant in any circumstances, the latter may vary in their degree of resistance according to the behaviour of the tissues of the host. Much work has been done on sulphonamide-resistant gonococci but much more remains to be done. Assuming that a given strain has acquired resistance will it, when transferred to another host, remain resistant ? Is the resistance transferred through innumerable generations of germs or does it tend to diminish more particularly when it passes through a series of human hosts ? If a germ undergoes a series of passages through human hosts does it tend to lose these characteristics : (i) in the presence of, or (ii) in the absence of sulphonamides circulating in their blood ? Numerous cases have been reported where two persons—generally husband and wife—have been infected with the same strain of organism and one has reacted to chemotherapy whilst the other has not. In such cases it is presumably the tissues of the host which differ, one being able to use the drug to the best advantage, the other not ; in this connexion it may be the degree of acetylation which makes the difference.

From Lieutenant-Colonel Campbell's paper it is clear that in Sicily and Italy there exist strains which are extremely resistant—at any rate when inoculated into the tissues of British, American and Canadian soldiers. Why should these strains prove so resistant ? We have no definite evidence as to whether they were resistant in the tissues of Italians or in those of their German masters but it seems probable that they were. Various suggestions have been put forward to account for the presence of these resistant strains : (i) that the Germans deliberately treated Italian women with sub-optimal doses in order to produce resistant strains for the Allies to pick up—this seems unlikely since it might recoil on their own heads ; (ii) that Italian women, especially prostitutes, regularly treated themselves. This again is unlikely since sulphonamides were in very short supply at the time of the invasion and women, especially in country districts (and rural strains seem to have been just as resistant as urban ones), would find them difficult to come by.

It is known that strains of gonococci vary greatly in their characteristics, e.g. in their antigenic powers, in their thermal death points, and in their resistance to sulphonamides. May we not assume that all strains of gonococci fall into two main categories, the sulphonamide-sensitive and the sulphonamide-resistant ? The more people who are treated for gonorrhœa with sulphonamides the more the sensitive strains are killed off and the more the relatively resistant strains survive. Moreover the resistant strains will tend to spread unchecked partly on account of their resistance and partly because the host carrying them remains contagious so much longer—it is a case of the survival of the fittest.

We see many examples of this in nature, human and otherwise, and if this process goes on unchecked it seems likely that sooner or later all the prevalent strains of gonococci will be sulphonamide resistant—truly a gloomy prospect just when we thought we had the means of eradicating the disease at hand. Were it not for penicillin, and perhaps other similar miracles, we might soon be back where we were in the pre-sulphonamide days ; even so the fact that there are penicillin-resistant strains too must not be overlooked and one is led to wonder whether penicillin will lose its charm in the course of time, just as the sulphonamides appear to be doing now.

However much we may theorize about the causation of sulphonamide resistance we are

left with the problem which we must tackle, and quickly, before these dangerous strains get a firm grip on the human race.

Partially sulphonamide-resistant gonorrhœa can usually be cured fairly easily with a little ingenuity. If a single course of say 20 g. over four to five days of one of the more effective preparations does not bring about cure, irrigations will often do the trick. If these fail it is well worth while giving a second course, preferably using a different preparation, e.g. if sulphathiazole was used in the first course, try sulphadiazine for the second. Some advise mild protein shock, using sterile milk, one of the proprietary preparations, or some form of bacterial vaccine, either between the two courses or during the second course. By these means most cases will be cured but it cannot be too strongly stressed that it is useless to keep on giving sulphonamides alone over long periods, especially with irregular dosage; such treatment is both dangerous and ineffective. Strains of gonococci which are completely resistant, and these can be quickly recognized by the fact that signs and symptoms show little or no tendency to abate whilst gonococci can be found in every smear, present a much more difficult problem. Most of these cases, probably as many as 95 per cent, will clear up with penicillin, but this drug is not yet generally available so that other means must be sought. It has been known for long that gonococci are very susceptible to heat though not to cold as many have stated. The thermal death point varies with the absolute temperature and the length of time for which the organism is exposed to it. Most strains succumb to 106° F. if subject to that for eight hours. This is the *raison d'être* of the various contraptions calculated to raise and maintain a patient's temperature by physical means, such as the hypertherm or inductotherm. By this means most resistant cases of gonorrhœa can be cured, especially if chemotherapy is used concomitantly, but they demand expensive instruments and highly skilled teams to work them and are time consuming. They are, therefore, only applicable to a few selected cases, and cannot deal with the matter on any great scale. Of other methods of inducing pyrexia the one most commonly used is the intravenous injection of typhoid vaccine; when a small amount of this is injected intravenously the patient's temperature tends to rise to 102° to 104° F., but the fever is of short duration; a proportion of cases is cured in this way but greater success is claimed if a second dose of vaccine is given when the temperature first begins to rise. In this way a higher degree of fever is obtained and it is more prolonged. In another article in this number by Captain Cronin will be found a third method, i.e. by giving the vaccine as an intravenous drip. By this means the temperature can be raised higher and for a longer period than by isolated injections and the results certainly seem encouraging. The method has the advantage that it can be carried out in any well equipped hospital, is inexpensive, and is not too time consuming. In this connexion it is well to sound a note of warning; it is dangerous to tamper with the heat regulating mechanism of the human body and this technique should only be adopted by those who understand it and where skilled nursing and the means of dealing with such conditions as hyperpyrexia, shock, or collapse, are to hand. The temperature should be taken hourly and the patient should be kept continuously under observation.

There is no doubt that sulphonamide-resistance—and perhaps this may come to apply to penicillin too—is becoming more and more common. Not only does this mean that more soldiers will be infected but they will remain longer in hospital so that the effect on manpower will be felt more and more as time goes on unless we succeed in finding means of dealing with it. Not only that, but there is evidence that, in more than one country other than Italy, on the Continent of Europe, the same problem is presenting itself. So far we have not been seriously troubled in the United Kingdom but, if some of the strains now prevalent in Italy and elsewhere are introduced into this country, they may prove very difficult to eradicate.

It behoves us, therefore, to take all possible steps to keep them out; this can only be done by treating cases up to cure on the Continent, and doing our best to see that not only uncured but also incubating cases of gonorrhœa do not slip through our fingers. If these resistant strains get a grip on the civilian population of this country, and particularly on the female part of it, the outlook will be serious indeed and incalculable harm may be done before we are aware of it.

Lecture.

FIRST-AID TEACHING TO NON-MEDICAL PERSONNEL¹,

BY COLONEL D. C. SCOTT, *O.B.E.*

It may appear strange that in the fifth year of the war we should be discussing here to-day the matter of First-Aid Teaching to Non-Medical Personnel in the Forces but it is a subject the importance of which is apt to be overlooked.

During my service it has been one of my duties to lecture to a variety of different people, ranging from R.A.M.C. orderlies and regimental stretcher bearers to Civilian First Aid personnel and V.A.D.s, and one has always followed the syllabus laid down in their manuals for their instruction. These manuals have altered little with the changing years.

As far as the Army is concerned, up to the outbreak of war, it was the custom to attempt to train the regimental stretcher bearers who, as a whole, were the unit bandsmen, to a high standard of efficiency so that they might be able to deal effectively in the matter of First Aid in any emergency.

The teaching was based on sound lines, that is to say, a preliminary course of elementary anatomy and physiology, followed by the various accidents, wounds, etc., and their appropriate first-aid treatment. It must be remembered that one was dealing with men who were to undertake a special job, viz. first aid to the wounded ; in other words it was their training for war.

With the exception of a talk to the unit on the First Field Dressing that, as a rule, was the only first-aid teaching given to non-medical personnel.

With the outbreak of war, however, with changed conditions of fighting occasioned by mechanization, open warfare, Commandos, and combined operations, troops are much more on their own and are often separated into small detachments isolated from their main body and as a result have to look after themselves and therefore it is necessary to give them some instruction in first aid.

Now, the combatant officer holds, and quite correctly, that it is the fighting man's job to fight and get on with the job for which he has been detailed and not to stop and look after his wounded comrade. To the leader a casualty is a loss which he can ill afford ; one less for the job in hand. The casualty must be left to help himself or be dealt with later. To do that he must have some instruction.

Again the presence of a badly wounded man in a post or armoured vehicle, calling out for help and no one with sufficient knowledge to aid him, is bound to have a demoralizing effect on the garrison or crew. So we have come to the question what of first aid do we want to teach our combatant troops.

It must be remembered that the curriculum of the fighting soldier of to-day is already a very heavy one. He has a lot to learn and little enough time to learn it in and, therefore, one must cut down first-aid teaching to the mere essentials ; one must make it as simple as possible and as practical as possible and it must be constantly repeated.

The medical officer, first of all, must enlist the interest and support of the Commanding Officer and the other officers of the unit. He must impress on them the necessity for first-aid and if they are not already trained he must train them and they will have to help in the training of the men. They should realize that, though it is the medical officer's first duty to keep the men fit to fight, his second is to alleviate suffering and to save men to fight again.

When talking to the men he must use simple and everyday language and avoid medical

¹ Lecture delivered at the Royal Society of Medicine on February 6th, 1944

technicalities. For example, he must not talk of hæmorrhage but of bleeding, a word they know and use or, again, broken bones rather than fractures.

One has heard a man say "I ain't got a fracture, I've broken my bleeding leg," which, after all, is not a bad description of a compound fracture.

The point is not often appreciated by the newly qualified medical officer but it is an important one.

Instruction should be given to small classes not larger than the size of a platoon and it must be given during training hours. It should be dove-tailed into whatever training is going on at the time. The instruction should be short, snappy and to the point. They should be told what has happened, what you are doing, and why.

"This man has broken his leg, any movement of the leg hurts him and it may cause him further damage. Therefore we must stop movement and we do this in the following way."

The use of model wounds is of great value as, first of all, they hold the men's attention and the soldier gets used to the sight of wounds and as a result they are not so scared when they see the real thing. I am going to show you them later and I think you will agree that they are quite realistic and at any rate they give the men something to see and work on and something to bandage.

Casualties can be arranged beforehand, the men find out what is wrong for themselves and deal with it and, by getting used to dealing with casualties whilst they are at work, they do not get scared when the real thing comes but deal with it automatically. The model wounds are simple to make out of newspaper, paste and a little paint. They are attached to the body by tapes.

Now, what are the essentials to be taught? I would put them under six headings: (1) Wounds; (2) Bleeding; (3) Broken bones; (4) Shock; (5) Burns; (6) Artificial respiration.

(1) *Taking wounds* first. There is no need for any classification. The men know of bullet, bayonet and shell wounds and one should show examples of each. There is no need to bother them with infection of wounds. All that they require to know is that they must cover it, either with their first field dressing or a shell dressing, as soon as possible and fix it firmly and not dirty the dressing with their hands.

Wounds of the head, chest and belly require a few words as to the position of the patient, etc.

(2) *Bleeding*.—Elaborate descriptions of circulation are not required. The soldier wants to know how he can stop bleeding. Impress on him from the first and repeat it constantly that, in the great majority of wounds, the bleeding can be controlled by a firm bandage over a dressing and that it is only when this fails that a tourniquet is required. Impress on him that the great majority of wounded do not bleed to death. Finally show the line of the arteries and how he can, if necessary, control them.

(3) *Broken Bones*.—Simple and compound fractures need only be discussed and the danger of converting the former into the latter. The frequency of the association of fractures with wounds should be stressed and the necessity of dealing with the wound first. Splinting must always be taught with improvised splints from their own equipment as it is all that they will have. The rifle splint should be taught.

(4) *Shock*.—The word is not understood by the average soldier and rather tends to alarm him. It is better to talk of the general condition of the man and how this condition is liable to be lowered after injury or loss of blood and how his general condition can be kept up by warmth, hot drinks and the position of the patient. They should be taught to anticipate and not wait for it to occur. Though blankets will not be available men should be taught that coats are necessary below as well as on top of the patient.

(5) *Burns* are much more frequent on account of universal use of petrol and, here again, the simplest instruction is necessary. If you have the first-aid outfit, use the sulphonamide cream and cover it with a dressing. If not, put on a dressing or cover it with your towel, wrung out in water if possible. *Be prepared for and treat shock.*

(6) *Artificial Respiration*.—The necessity for instruction is emphasized by the surprising number of non-swimmers that one comes across and, with amphibious operations, casualties may occur and lives may be saved. Schafer's method should be taught and its use for poisoning by exhaust gases and charcoal fires should be stressed.

You may notice that I have said nothing of stretchers or stretcher exercises. This is not in their province. They must only make the man comfortable and leave him for carriage by others or, if he is able, to make his own way back. They should, however, be taught to leave some sign as to where the wounded can be found such as a rifle stuck in the ground.

So much for the regimental medical officer. Now it is the duty of the Administrative medical officer, the A.D.s.M.S., D.D.s.M.S., to impress on the General Staff the necessity for testing out first-aid teaching in all exercises and schemes by arranging for casualties and for their evacuation. It is too late to wait until dire necessity calls for the action which should have been practised and made perfect.

I must commend to your notice a most useful pamphlet which the Canadian Authorities have produced for the instruction of instructors of first aid to non-medical personnel and, at the end of this session, you will be shown a film on "First Aid" which I think would be hard to better.

Well, gentlemen, I must apologize for talking to you in this rather dogmatic way on such an elementary subject but very often the simpler subjects are the hardest to get across and we have got to get them across.

Clinical and Other Notes.

"COMPO" RATION BOX LATRINE.

BY THE STAFF OF THE FIELD SANITATION DEPARTMENT, ARMY SCHOOL OF HYGIENE.

IN conditions where shallow trench latrines would normally be used, but where even ground and other circumstances make some kind of improvised seat an advantage, a simple arrangement is possible by making use of the box and lids of the "Compo" Ration for fourteen men. These boxes may be of two types; one in which wood framing and waxed millboard panels are used and the other which is made entirely of wood.

These boxes can easily be utilized so as to provide a simple latrine cover—which can be set over an earth latrine the length and breadth of which should be slightly smaller than the dimensions of the box and the depth as much as can be conveniently obtained with ordinary excavating tools.

The bottom of a box (preferably of wood) can be used as a distance piece and footrest to



form a solid "standing" in between each of the two boxes and the lid of the box as a loose flyproof cover for the latrine seat. This will have to be replaced by hand.

The excavated earth should be stacked behind the latrine and used to cover up freshly deposited feces (as is done with Shallow Trench Latrines) and also to fill in the latrine when deposits have accumulated to within six inches of the surface of the ground.

The photograph illustrates this use of the "Compo" Ration Box as a temporary latrine.

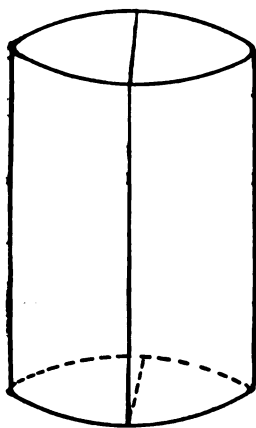
It is not suggested that this arrangement is ideal but, in certain conditions, e.g. on a beach-head, it would provide a cleaner and more attractive latrine than open shallow trenches.

A NEW TYPE OF LATRINE SUPERSTRUCTURE IN NORTH AFRICA.

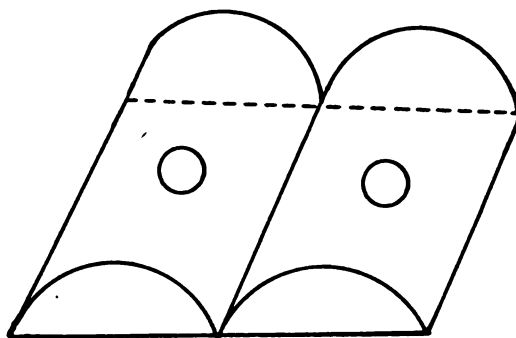
BY MAJOR G. M. HOBBIN,
Royal Army Medical Corps.

THROUGHOUT the war, obtaining the necessary timber has always been one of the chief problems in the construction of sanitary fittings. The amount of timber required to make one box-type superstructure for a deep-trench latrine is considerable and as our Armies grew larger so also did the problem of providing satisfactory latrines.

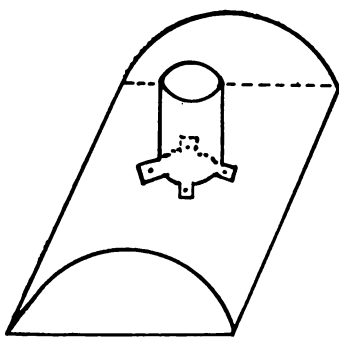
After the fall of Tunis the large numbers of prisoners to be provided for made the matter



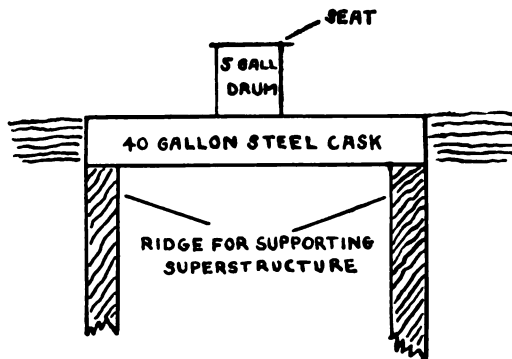
40 gallon cask cut across both ends and down one side.



Cask bent backwards to form a double superstructure showing holes cut for 5-gallon drums.



5-gallon drum bolted to cask by means of flanges cut from side of drum.



Cross section of trench showing superstructure in position.

acute and by the time of the fighting in Sicily supplies of timber for this purpose were no longer available and the necessity to improvise was urgent.

Squatter-type superstructures made of concrete slabs were tried but these were very unpopular; a satisfactory lid could not be fitted by ordinary methods and they were difficult to flyproof. Moreover, they were extremely cumbersome when it came to moving them to new pits and they often got broken.

This led to the construction of another type which had none of the above disadvantages. It is made from unserviceable 40-gallon steel casks and 5-gallon oil drums. No supporting

beams are required in its erection and the only timber employed is for the seat, which is smaller than the ordinary bucket seat and more economical in material.

A steel cask is split down the middle lengthwise with a hammer and cold chisel, except at one side, i.e. two ends and one side are cut so as to leave two half casks attached along one side. The two halves are then bent backwards along the line of attachment so as to produce two domes when laid face downwards. A hole having the same diameter as the end of a 5-gallon drum is then cut in the centre of each dome. The two ends are removed from a 5-gallon drum and a skirting is cut away incompletely from one end so as to leave four lugs by which it can be fixed with nuts and bolts to the top of the dome directly over the hole. Another drum is similarly fitted on the other dome. Flyproofing of the joint between the cask and the drum, if not already complete, can be perfected by tapping the edges into apposition with a hammer.

Two small wooden seats with self-closing lids—preferably the rubber hinged type—are now fitted to the two 5-gallon drums and the unit is ready to be placed over the deep trench.

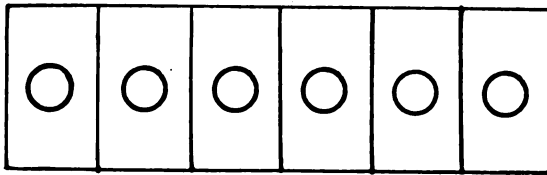


Diagram showing three two-seater units in position over one trench.

The under surface of the seat itself is constructed so that it fits tightly on the top of the drum and cannot be easily knocked off.

Two-seater units such as this can be laid side by side across a deep trench to form a homogeneous cover. In fitting these over the trench sufficient turf should be removed from the edges of the pit to sink the steel domes to ground level. The bases of the 5-gallon drums are now at ground level and when the niches between the domes are filled up with soil a level surface is obtained and complete flyproofing ensured.

The width of the trench required is several inches less than the length of the steel cask as the units are laid lengthways across the trench and a few inches must be left at either end for support.

This provides a good, strong superstructure of very light weight made in units which can be easily handled and accurately pieced together whenever a new trench is required. It can also be more easily and perhaps more completely flyproofed than any other type. The lids are less likely to be broken off than those of the squatters as they must be opened by hand and not by foot.

It may be said that these latrines have been installed at a number of camps and found to be entirely satisfactory and that they served the purpose for which they were invented by getting over the shortage of timber.

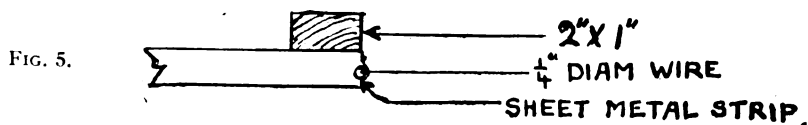
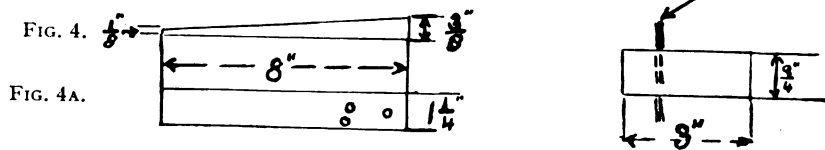
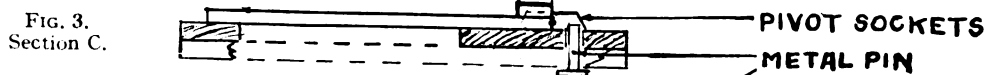
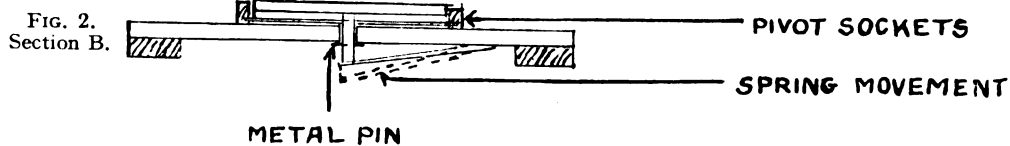
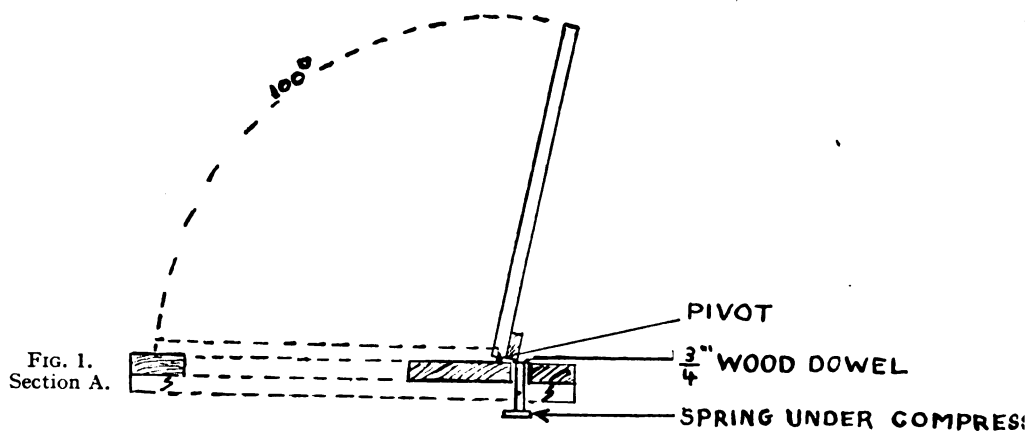
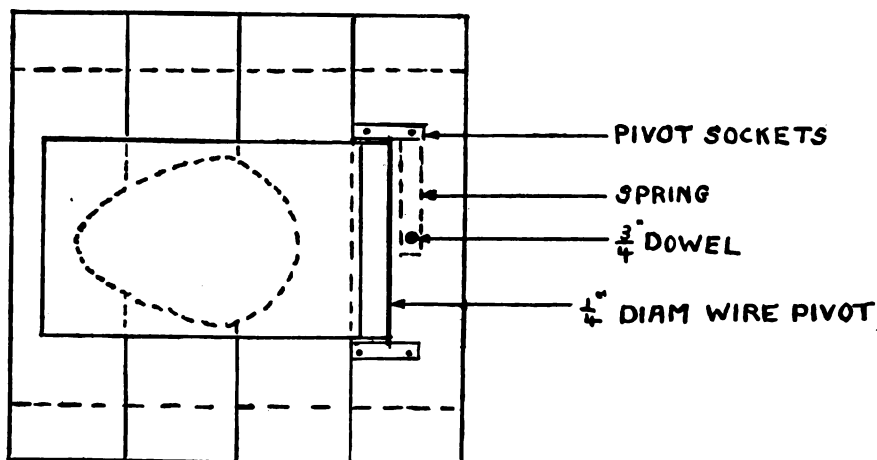
SELF-CLOSING LATRINE SEATS.

BY STAFF-SERGEANT C. D. COX,
Royal Army Medical Corps.

THE construction of a fool-proof self-closing latrine lid is a constant source of difficulty. A block placed immediately behind the hinged edge of the seat was commonly used in the last war but proved a failure in that it supplied an excellent fulcrum from which to prise off the hinges.

Rubber hinges were a success in that they allowed the seat to be pushed back beyond the right angle without harm.

PLAN.



Not to scale.

The following simple device, made from readily available materials, has proved very successful and possesses the same advantages as the rubber hinge.

Materials required :—

- (A) Circular wooden dowel (or peg) 3 inches long, $\frac{3}{4}$ inch diameter.
- (B) A length of wood (hard wood, if possible) 8 by $1\frac{1}{2}$ inches wide, tapering from $\frac{3}{4}$ to $\frac{1}{4}$ inch (to act as a spring).
- (C) Two wooden blocks 4 inches long, $1\frac{1}{2}$ by 1 inch for pivot socket.
- (D) A length of wire $\frac{1}{4}$ inch diameter to be 2 inches longer than the width of the lid—to act as a pivot.
- (E) If not already attached, a piece of wood 2 inches by 1 inch, the width of the seat, is required.

Construction.—Primarily the original hinges are removed from the lid. The backing (piece of 2 by 1 inch) is then nailed or screwed flush with the back edge of the lid, a groove is cut into this edge and the wire fixed in position by means of a strip of sheet metal (e.g. petrol tin). See (D) and (E) above and fig. 5 in the drawing.

A hole is bored in the side of the two 4 inch wooden blocks (see (C) above) to accommodate the ends of the wire. These holes are finally fixed in position allowing free movement of the lid (see plan).

The lid is now in position—a hole 1 inch in diameter is bored in the seat $1\frac{1}{2}$ inches from the back edge of the lid and into this hole the dowel (or peg) is inserted. A metal pin (e.g. a nail) is passed through the dowel to prevent movement. The spring (see (B) above and figs. 4 and 4A) is screwed in position on the underside of the seat so that the dowel (or peg) rests on the tapered end.

Action.—On the lid being raised the backing exerts pressure on the dowel, thus forcing the spring downwards. On release the spring automatically returns to its normal position and, in doing so, it pushes the dowel upwards and thus closes the lid.

The advantages of the device are as follows :—

- (1) May be fitted to any type of latrine seat.
- (2) Easily improvised in the field where hinges are not always obtainable.
- (3) No stop rail, rubber hinges or iron hinge required.
- (4) The lid can be fully opened to 100° or more. This is a decided advantage over the stop rail which it is possible to open only to 85° .

REPORT ON 2,500 CASES SEEN IN THE EYE DEPARTMENT OF A GENERAL HOSPITAL.

BY CAPTAIN H. J. STERN,
Royal Army Medical Corps.

THIS report covers the period from the end of February to the end of August, 1943. Two campaigns took place during this time: the advance from the Mareth Line to Tunisia and the Sicilian Campaign. They determined the character of the work done in these six months.

The Eye Department was opened in Tripoli four weeks after its occupation; previously ophthalmic work was done by a Mobile Ophthalmic Unit. The largest proportion of cases were those attending for refractions—broken or lost spectacles had to be replaced or repaired or eyes had to be tested, especially after the Tunisian Campaign when the 8th Army returned to Tripoli and refitted. But out of 1,616 such cases only 642 required replacement of glasses, a change of their spectacles or new issue of spectacles. It is a common opinion among soldiers that the sun or the sand in the Middle East does harm to their eyes. In the greater number of soldiers who do not need glasses there is always a certain percentage—fortunately small—who are not at all satisfied when they are told that their eyes are normal. They want eye

baths, sun glasses, "peak-hats," excused duties in the open, and are generally a nuisance. Frequently they go from one Ophthalmologist to another, filling waiting rooms and becoming neurotics. A firm attitude toward these cases by Ophthalmologists and Regimental Medical Officers is very important and rarely met with. However, far the greater number of these soldiers just want a "check" and are quite happy when they hear that their eyes are all right.

Two types of cases proved to be very difficult to deal with ; soldiers who declare themselves to be night-blind and soldiers with decreased visual acuity without apparent cause. Night-blindness is the obvious excuse of a driver who has damaged a vehicle at night and is put on a charge. Although it is not likely that, with uniform good diet, a hemeralopia should develop in a healthy individual, it is impossible to pronounce a definite judgment without an adaptometer and in doing so to decide if a soldier is to be punished or not.

Another difficult type is the man who states that his eyes have become weak in the past few months. If no refractive error is present, or no correction possible, and the usual tricks to find out if the man is "swinging the lead" have failed, only two possibilities are left : an optic neuritis or a functional condition. If one eye happens to be genuinely amblyopic a central scotoma is a normal finding and it is easy for the man to produce one in the second eye as well. And even if the neurologist, the E.N.T. Specialist and Dental Surgeon do not find any organic signs, and other causes can be excluded, it is a difficult decision to stamp a man as a malingerer. The matter becomes still more difficult when "functional amblyopia" is the tentative diagnosis. Without the help of a psychiatrist it is impossible to say if a man is worried because his eyes are bad or if his eyes are bad because he has worries. This of course does not apply to typical hysterical amblyopia where the attitude of the patient and the dramatic onset make the diagnosis obvious. Eleven cases of hysterical blindness of different degrees were seen, 8 of them "battle casualties." They are usually easy to treat by giving them dark glasses and some unobtrusive reassurance and isolating them as far as possible from "spectators."

Two hundred and ninety-nine cases of conjunctivitis or blepharitis were seen. It was not always possible to make a bacteriological examination but the usual types were the acute muco-purulent conjunctivitis (mostly streptococci and staphylococci, only very occasionally Koch-Weeks) and the angular blepharo-conjunctivitis. Not a single case of pneumococcal conjunctivitis was seen. The absence of other pneumococcal infections is worth mentioning here, e.g. corneal ulcer or dacryocystitis. Dacryocystitis was not seen at all and, amongst the thirteen cases of corneal ulcer, not one was of pneumococcal origin. Herpetic infections were relatively frequent at a certain time—early summer—but disappeared completely in July. Eight cases showed dendritic keratitis and six disciform keratitis. At the same time three cases of recurrent erosion of the cornea were observed, a condition which is also regarded as of herpetic origin. Superficial punctate keratitis was seen only in one case which is interesting as this condition as well is supposed to be a herpetic infection.

Four cases of trachoma were seen but only once in a British soldier ; this case, however, was a trachoma IV with smooth scars, acquired years ago in Britain.

Thirteen cases of pterygium in non-coloured patients were seen : ten of them were South Africans. Mullock-Hower has observed a high incidence of pterygium in the Dutch West Indies and attributed it to the infra-red radiation together with chronic irritation by sand or dust. The markedly high incidence in South Africans seems also to indicate a climatic—or else racial—factor in the causation of this condition.

A great number of "industrial" accidents were seen—many Base Workshops were situated in the neighbourhood of the Hospital. The number of corneal foreign bodies and abrasions was 158. Although the lapse of time before treatment was frequently one or even two days, and local siderosis had often taken place, all of them healed without complications. This would not have been the case in an area where pneumococci are normal inhabitants of the conjunctival sac.

Four "Hammer and Chisel" injuries were seen.

One "accident" is worth mentioning: An Anglo-Indian soldier presented himself with a story that he could not open his eye when he woke in the morning. When the lower lid was everted a deep violet conjunctiva was seen with a piece of copying pencil about the size of a pea in the lower fornix. The cornea was opaque and violet and at the site of the foreign body there was a deep ulcer in the conjunctiva, partially involving the sclera. The man declared that the night before he had marked a sheet with copying pencil and the point had broken off. He had felt something in his eye but did not bother about it and a little while later he went to sleep. The eye could finally be saved although some symblepharon resulted and the cornea remained slightly hazy. The man had so bad a time that I felt he was sufficiently punished and did not report him as a case of self-inflicted injury.

One hundred and forty-four battle casualties were seen. The character of the cases in both the Tunisian and Sicilian Campaign was much the same. The majority of cases showed either total destruction of the eye (22), perforations with or without intraocular foreign bodies (24) or gross blunt injuries with massive vitreous hæmorrhages (19). The number of cases where an operation other than removal of the eye could be done was unfortunately very small. Even in a number of these the final fate of the eye was either blindness or removal. The proportion of injuries to both eyes was relatively low. Among 144 battle casualties 11 had both eyes seriously injured; 3 of them had both eyes removed, in 3 the fate of one or both eyes was not yet decided when they were evacuated and in the remaining 5 cases one eye at least could be saved. The worst injuries seen concerned a man who had picked up a booby trap and had lost both eyes and both hands.

An interesting feature in cases of total destruction of the eye was observed: In those eyes where iris or vitreous was lying openly behind the lids there were no signs of infection or pus. Even ten or fourteen days after injury, with no treatment except vaseline gauze dressings, the iris was clean and no pus was seen either on it or in the vitreous. This might have been explained by the course of sulphanilamide which all patients of the Tunisian Campaign had received; but conditions in the Sicilian Campaign were such that the casualty had rarely a sufficient dose of sulphanilamide, if any at all, yet these disorganized eyes were equally clean and free from gross infection. Where the injury was not so extensive and a conjunctival hood had been made over the torn cornea the eyes frequently showed severe infection. A likely reason for this is the fact that free drainage was maintained in eyes with totally destroyed cornea and the steady flow of intraocular fluid prevented the invasion by germs.

It has been mentioned that during the Tunisian Campaign practically every casualty had received a full course of sulphanilamide which was not the case in the Sicilian Campaign. It must, however, be said that the condition in which casualties arrived did not vary much. It is obvious that a gross perforation of the eye, with or without intraocular foreign body, usually leads to an enucleation. Small penetrating injuries with or without foreign bodies in the eye frequently remain sterile whether or not sulphanilamide is given. This should not be interpreted to mean that enucleation was advised in every case of serious injury. A scleral suture or a simple conjunctival hood with a full course of sulphonamide may result in a useful eye and an enucleation can be deferred until the end of the second week. This limit should be observed in order to insure against sympathetic ophthalmia.

All varieties of foreign bodies were seen: corneal stone or metal splinters; foreign bodies in the lids, in the anterior chamber, the lens, the vitreous; double perforations with a foreign body in the orbit; foreign bodies which had miraculously missed the eye and became lodged in the ethmoids or underneath Tenon's capsule. In one case a big shell splinter had entered the right orbit through the lower lid, missed the eye, penetrated the right nasal bone, the nasal septum, the left sphenoid, severed the left optic nerve and was finally removed from the left masseter. A very unusual foreign body was seen in a case where a booby trap had injured several fingers: the eye was perforated by a piece of bone from a finger.

The majority of foreign bodies in mine or shell injuries were stone. Metal splinters were rarely magnetic. Extraction with the giant magnet by posterior sclerotomy or through the entry wound was always attempted but yielded a result in only a small number of cases.

for a treatment of bites. Bed bugs were found here and there. Crab lice were best countered by Cuprex while body lice occurred only in winter when troops came from abroad. Dipping the clothes in benzene or gas treatment was used. Phlebotomus was not seen and there was no sandfly fever although it was often diagnosed *faute de mieux*. The malarial mosquitoes only occurred in a few of the cases and a daily tablet of 0.06 Atebrin was a successful prophylaxis. Bacterial dysentery, mostly Flexner, and also not infrequently a serious Shiga-Kruse, is widespread owing to the frequency of the flies while contact spread is a secondary consideration only. Amœbic dysentery is much less common. Both forms of dysentery may occur together. Hepatitis epidemica occurred with a peak in September-October and is regarded as an infectious virus disease. It is possible that the vector is the fly. The Italians were much less affected owing to natural immunization during their youth. The incubation period is two to three weeks and the duration of the disease two to six weeks. Although the disease was frequent, there were only a few deaths. Sores of the lower limbs with undetermined mixed flora instead of the typical spirochætal-bacillary symbioses were found. Cutaneous leishmaniasis was not observed. Impetigo contagiosa was very frequent but readily healed with white precipitate ointment. Afridol soap was effective in boils and eczema. The common tropic skin diseases such as Lichen tropicus, ringworm and other dermatomycoses did not appear to develop well in the dry climate. Isolated cases which relapsed generally healed with one to two injections of 0.6 Neosalvarsan. Although plague is supposed to be endemic throughout the whole of North Africa it was not observed. There were a few exceptional cases of typhoid but they involved rare strains. Angina, diphtheria, rheumatism and neuritis were common and chilling undoubtedly was a factor in the ætiology of rheumatism and dysentery. There were few cases involving the respiratory organs. The cardiac system was subjected to increased strain which showed generally as tachycardia, especially after infectious diseases. In these cases and in gastro-intestinal infections, smoking is absolutely forbidden. The desert climate has a favourable effect on kidney disorders. Particular care must be taken in the desert to avoid alcohol. V.D. was uncommon in Libya itself. Trachoma occurred together with inflammation of the conjunctiva through dust irritation.

W. P. KENNEDY.

Reviews.

DEMONSTRATIONS OF PHYSICAL SIGNS IN CLINICAL SURGERY. By Hamilton Bailey, F.R.C.S. Ninth Edition. Bristol: John Wright & Sons. 1944. Pp. 351. Price 25s.

Mr. Hamilton Bailey is a master, if not the master, of surgical illustration and can fairly claim that the title of his book is not misleading—at first sight one might suppose a demonstration of physical signs in print was an impossibility. Every illustration shows with emphasis the point which it is intended to bring out and the coloured plates in particular are of almost horrifying clarity. This book is one which all of us must have used at some time, whether as examination candidates on the eve of “the clinical” or as teachers about to entertain a class of students, and one of its merits is the speed with which one can skim through it; another is the historical footnotes.

Mr. Hamilton Bailey's very facility leaves one at times with a feeling that surgical diagnosis is not quite as easy as he makes it seem. In writing a book about one corner of a subject, it is admittedly difficult to know where to stop and, if one objected that the pathology underlying and producing signs received somewhat brief attention, the author might well retort that the book was on physical signs, not pathology; but this point reminded me of Sir John Bland Sutton's remarks on the ease of writing big books and the great difficulty of writing small ones.

To select a few points for criticism, one might begin by registering surprise that the chapter

on the knee-joint contains no reference to the measurement of the thigh for quadriceps wasting. It is true that the test is mentioned elsewhere in the book but there is no harm in repetition of important points.

In the diagnosis of aneurysm all is reasonably plain sailing if there is expansile pulsation but what if the contents of the sac be clotted? Early in the book the remarks on pain seem brief and inadequate when compared, for example, with Ryle's routine for elucidating the nature of a pain. The causes of persistent suppuration with sinuses are shortly dismissed on page 38 though a section on page 120 somewhat expands the list. And surely the statement that fractures of the mandible are, as often as not, compound into the mouth is an under statement of the frequency of compound fractures in this region.

These are small criticisms. What matters is that the medical profession, even if it cannot in wartime secure the lemon with which Mr. Hamilton Bailey diagnoses his submaxillary calculi, has demanded nine editions of his book.

R. S. H.

A MANUAL OF PULMONARY TUBERCULOSIS (Part I) and an ATLAS OF THORACIC ROENTGENOLOGY (Part II). By David O. N. Lindberg, M.D., F.A.C.P. London: Baillière, Tindall & Cox. 1943. Pp. xviii + 223. Price 36s.

Part I gives a very comprehensive account of pulmonary tuberculosis in a concise and practical manner and within the space of 72 pages will be found all the modern views regarding diagnosis, treatment and prevention. As this is intended to be a practical manual, aspects such as allergy, immunity, resistance and other controversial subjects have purposely been omitted but a chapter is devoted to the technique of chest radiography including tomography and its interpretation.

Radiography is an essential feature of tuberculosis work and **Part II**, an Atlas of Thoracic Roentgenology, contains an excellent series of plates demonstrating the radiographic appearance of the various types of pulmonary tuberculosis and the results of treatment. Some non-tuberculous conditions which are likely to be encountered are also included.

This is an up-to-date and practical manual which will prove of great value to those engaged in tuberculosis work.

FRACTURES AND JOINT INJURIES. Third Edition. By R. Watson-Jones, B.Sc., M.Ch.Orth., F.R.C.S. Edinburgh: E. & S. Livingstone. 1943. Vol. I. Pp. 420. Vol. II. Pp. 556. Price 75s. the set.

We welcome the third edition of Watson-Jones' book on Fractures and congratulate the writer that a new edition has been called for so quickly following the original publication in 1940. The medical profession has plainly shown that a standard textbook on fractures was needed and that this is the book they wanted.

The book is now published in two volumes, rendered necessary by an increase in the number of pages and illustrations. The first volume is concerned with the principles of fracture treatment together with sections on Vascular Injuries, Nerve Injuries, Open Fractures and War Wounds. Injuries of the Trunk and Head, Facio-Maxillary Injuries, together with injuries of the Spine are also considered in this volume. The second volume is devoted to the limbs and finishes with a section on Rehabilitation and the Organization of a Fracture Service. The new sections on vascular injuries and on war wounds are both excellent and will repay careful reading.

The spiritual grandparents of this book are Hugh Owen Thomas and Boehler. Thomas's principle of rest, enforced, uninterrupted and prolonged, is modified by Boehler's principle of allowing the maximum activity compatible with immobilization in plaster. The treatment of fractures of the tibia is characteristic. Plaster is applied from the groin to the tips of the toes and the patients are not allowed to walk until the fracture is united. In this respect Watson-Jones does not go as far as Boehler who recommended walking at two to

three weeks. Viscopaste is then applied to control the œdema since the vascular system of the limb has come to rely on the external support of the plaster.

The principle of prolonged immobilization is also applied to fractures of the femur. Static contractions of the quadriceps are encouraged but knee movements are not started until removal of traction, usually after twelve to fifteen weeks. In our experience, a more rapid and complete recovery of function is obtained if knee movements are begun in the first week or two, and union is certainly not delayed.

In our opinion plaster of Paris is somewhat too freely applied and in some instances it is difficult to see its value. For instance, spiral fractures of the metacarpals are immobilized in plaster, cracks in the os calcis without displacement have plaster applied for two months and bumper fractures of the upper end of the tibia are treated in plaster for ten weeks. One gains the impression that, in fractures of the spine, irrespective of the degree of compression and the age of the patient, reduction is attempted and a plaster of Paris cast is applied for four months; but it is surely better, in a man of fifty with a minor degree of compression, to accept the slight deformity and begin exercises at once. A cast is also applied in high dorsal fractures of the spine when it is admitted that they cannot be reduced and cannot be controlled by the plaster.

The restoration of movement on removal of the plaster and the strengthening of muscles on resumption of weight-bearing are naturally an important feature of the method and are dealt with in an excellent chapter on Rehabilitation. We should like to see even more emphasis on the avoidance of stiff fingers and stiff toes which accounts so often for gross loss of function.

Watson-Jones is cautious in his attitude towards internal fixation. If internal fixation is necessary, he prefers a graft to a plate. It is allowed that, in the treatment of an oblique fracture of the tibia, reduction can best be maintained by the use of a screw, but only one screw is recommended. Surely it is sounder to use two screws. It reminds one of an unmarried lady who, having had a baby, claimed in extenuation that it was only a very little one.

There are few innovations in treatment. The author is wisely noncommittal about the use of transfixion pins. The section on fractures of the ulna with dislocation of the head of the radius, on supracondylar fractures of the femur and on fractures of the ankle, has been clarified and the external rotation fracture is now clearly differentiated from the abduction fracture, as it should be.

The book is beautifully printed, well indexed and superbly illustrated. A particularly happy note is struck by the thumb-nail sketches in small print, which occur frequently as foot-notes, telling points of interest about such people as Hugh Owen Thomas, Bigelow, Bennett or Abraham Colles.

This is by far the most important book on fractures in the language and its influence and value have been incalculable. It reflects the greatest credit on the publishers as on the author and may be confidently recommended to all surgeons who deal with bone and joint injuries and to those who are called upon to handle war casualties. The production of the new edition at the present time is very opportune.

EMERGENCY SURGERY. Fifth Edition. By Hamilton Bailey, F.R.C.S.Eng. Bristol : John Wright & Sons, Ltd. 1944. Pp. viii + 969. Price 75s. net.

This book fulfils admirably the author's intentions, according to his preface. It presents an eminently practical and scientific method of approaching, and effectively treating, surgical emergencies, based chiefly on his own extensive experience and presented in the clear, interesting and methodical manner of a proved teacher. There is no lack of helpfully dogmatic and decided opinions as it abounds in advice, tips and wrinkles backed by practical reasoning and proved by trial and follow up. Any young surgeon, and many older ones, would benefit by getting a copy and keeping it in daily use.

Notices.

MEDICAL ASSOCIATION OF SOUTH AFRICA (B.M.A.).

A MEETING of the Cape Western Branch was held at Cape Town on February 25, 1944, when the valedictory address, "A Mediterranean Interlude," was given by Colonel R. L. Impey, as the retiring President of the Branch for the year 1943.

Colonel Impey paid a high tribute to the work done by the R.A.M.C. He said the regular R.A.M.C. officers were masters of organization and administration. During war they obtained the help of the best surgeons and physicians that Britain had. With this combination they had built up a medical service that was second to none. They worked on the principle that it was of the utmost importance that the first treatment that the casualty received should be the correct treatment. With this in view, teams of surgical experts, representing various specialties, were placed as near the front as was reasonably possible.

PRINCESS TSAHAI MEMORIAL HOSPITAL FUND.

HER MAJESTY THE QUEEN has graciously sent a donation of £100 to Lord Davies, Chairman of the Council established to promote the Princess Tshai Memorial Hospital now being erected in Addis Ababa in memory of the young Ethiopian Princess.

It will be recalled that the Princess Tshai gave the five years of her exile to devoted service in British Hospitals and that she died shortly after her country was liberated by the aid of Britain and the Allies and within a year of her return home whilst actively engaged in organizing the health services of her country.

This kind gift of Queen Elizabeth has been gratefully received by the Honorary Treasurer of the Memorial Council, Lord Horder, *G.C.V.O.*, who will gladly acknowledge donations, c/o Messrs. H. Reynolds & Co., Hon. Accountants, 1, Bloomsbury Court, High Holborn, W.C.1.

"THE BIOCHEMISTRY OF ADDISON'S DISEASE."

MESSRS. CIBA, LTD., draw attention to the statement made on page 139, last paragraph, of the above article, in the March issue of the *Journal*, by Lieutenant Grenville Mathers, R.A.M.C.

They state that the name D.O.C.A. applies only to one brand of desoxycortone acetate, the name recently approved by the General Medical Council for desoxycorticosterone acetate. The Ciba brand of this hormone is known as Percorten, particulars concerning which can be obtained from Messrs. Ciba, Ltd., Horsham, Sussex.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.

PROFESSOR ALEXANDER FLEMING, F.R.S., has accepted the invitation of the Council of the Royal Institute of Public Health and Hygiene to be appointed as the Harben Lecturer for 1944. His subject will be: "Penicillin: Its Discovery, Development, and its Uses in the Field of Medicine and Surgery."

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in **duplicate** through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps, and articles of a non-scientific character, may be accepted for publication under a *nom-de-plume*.

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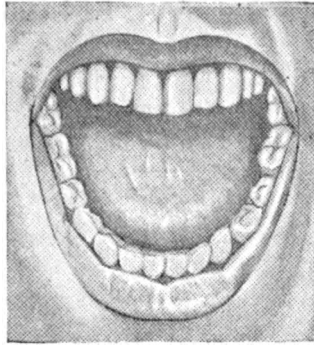
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JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

JANUARY, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

December 14, 1943.—The KING has been graciously pleased to grant unrestricted permission for the wearing of the following decoration which has been conferred upon the undermentioned officer in recognition of services in the cause of the Allies.

Decoration Conferred by the President of the Republic of Poland.

Order of Polonia Restitua. 4th Class.

Major (temp. Lt.-Col.) W. A. D. Drummond (31405), R.A.M.C.

December 16.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Col. (acting) James Alexander Matheson, M.B. (49588), Royal Army Medical Corps.

Col. (temp.) Manfred Morris, M.D. (22017), Royal Army Medical Corps (Swanage).

Major (temp. Lt.-Col.) Victor Jorge Perez, M.D. (15612), Royal Army Medical Corps.

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. (acting Major) George David Walker Adamson (163369), Royal Army Medical Corps (Sheffield).

Capt. John Bain Hurl, M.B. (107203), Royal Army Medical Corps.

Capt. (acting Major) John Scott Keress, M.B. (159918), Royal Army Medical Corps (Dumfries).

Miss Agnes McGeary, A.R.R.C. (206315), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Mossend, Lanarkshire).

Capt. John Graham Scott, M.B. (97875), Royal Army Medical Corps.

December 16.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Gordon Robert Marshall (135685), Royal Army Medical Corps (Chester).

The Royal Red Cross.

To be Additional Associates of the Royal Red Cross, Second Class.

Miss Marguerite Badgley (206023), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Topsham).

Miss Celia Jane Haycock (206202), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Cannock, Staffs.).

Miss Nora Margaret Kersley (206259), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (S. Tasmania).

Miss Hildreth Eileen Whale (206522), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service.

December 16.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

Brig. (temp.) G. E. MacAlevey, D.S.O., M.C. (15627).

Col. (acting) W. J. Officer, M.B. (21400).

Major (temp. Lt.-Col.) D. M. Ahern, M.B. (56530).

Major (temp. Lt.-Col.) J. H. Baird, M.B. (5597), (Res. of Off.).

Major (temp. Lt.-Col.) A. N. T. Meneces, M.B. (44406).

Capt. (acting Lt.-Col.) F. J. Manning (94288).

Capt. (temp. Maj.) J. D. Allan, M.D., M.R.C.P. (87718).

Capt. (temp. Maj.) J. C. Babbage, M.B. (75669).

Capt. (temp. Maj.) G. B. Heugh (70114).

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7368976 L/Cpl. A. Dillon.

7364750 Pte. B. Katz.

7518263 Pte. R. S. Ramussin.

January 1, 1944.—The KING has been graciously pleased to give orders for the following promotions

in, and appointments to, the Most Honourable Order of the Bath :—

To be Additional Members of the Military Division of the Third Class, or Companions, of the said Most Honourable Order :—

Maj.-Gen. Alexander Gordon Biggam, *O.B.E.*, *M.D.*, *F.R.C.P.* (14900), late Royal Army Medical Corps, Honorary Physician to the King.

Lt.-Col. (temp. Col.) (acting Maj.-Gen.) Charles Max Page, *D.S.O.*, *M.B.*, *F.R.C.S.* (51065), Royal Army Medical Corps.

The KING has been graciously pleased to give orders for the following promotion in, and appointment to, the Most Excellent Order of the British Empire :—

To be Additional Commander of the Military Division of the said Most Excellent Order :—

Lt.-Col. (temp. Col.) Frederick Harris, *M.C.*, *M.B.*, Royal Army Medical Corps.

The KING has been graciously pleased, on the advice of His Majesty's Australian Ministers, to give orders for the following appointments to the Most Excellent Order of the British Empire :—

** To be Additional Officers of the Military Division of the said Most Excellent Order :—*

Lt.-Col. Guy Pascoe Crowden, *T.D.*, *M.R.C.P.* (36428), Royal Army Medical Corps, Territorial Army.

Lt.-Col. James MacLure Smellie, *M.D.*, *F.R.C.P.* (26620), Royal Army Medical Corps, Territorial Army.

The KING has been graciously pleased, on the advice of His Majesty's New Zealand Ministers, to give orders for the following appointments to the Most Excellent Order of the British Empire :—

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. (Qmr.) (acting Major) George Ashton (101236), Royal Army Medical Corps.

Capt. Richard James Cairns (216479), Royal Army Medical Corps.

Lt. (Qmr.) (temp. Major) William Henry Carlton (211652), Royal Army Medical Corps.

Miss Winifred Grace Houlding (213493), Sister, Territorial Army Nursing Service.

Lt. (Qmr.) Charles Arthur Milner (154199), Royal Army Medical Corps.

Capt. Francis Leslie Potter (188257), Royal Army Medical Corps.

Capt. (temp. Major) Charles Martin Row (38899), Royal Army Medical Corps.

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) to the undermentioned :—

No. 7248896 S.Sjt. (acting Warrant Officer, Class II) George Henry Howard, Royal Army Medical Corps.

No. 7390909 Cpl. Frederick George Lansley, Royal Army Medical Corps.

No. 7377711 Cpl. Ernest Sirrell, Royal Army Medical Corps.

No. 7516060 S/Sjt. James Alfred Tierney, Royal Army Medical Corps.

No. 7259898 S/Sjt. Albert Warburton, Royal Army Medical Corps.

January 1, 1944.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Royal Red Cross :—

Bar to the Royal Red Cross—First Class.

Miss Geraldine Catherine Ball, *R.R.C.*, Principal Matron (206032), Queen Alexandra's Imperial Military Nursing Service.

Miss Margaret Myllim Roberts, *R.R.C.*, Matron (206653), Queen Alexandra's Imperial Military Nursing Service.

To be Members of the Royal Red Cross, First Class.

Miss Edith Maud Hill, Sister (acting Matron) (H. 332), Queen Alexandra's Imperial Military Nursing Service.

Miss Dorothy Annie Johnson, Sister (acting Matron), (206243), Queen Alexandra's Imperial Military Nursing Service.

Miss Alice Gertrude Murrie, *A.R.R.C.* Matron (acting Principal Matron) (206289), Queen Alexandra's Imperial Military Nursing Service.

Miss Jane Amelie Patterson, *A.R.R.C.*, Matron (acting Principal Matron) (206371), Queen Alexandra's Imperial Military Nursing Service.

Miss Gwylays Roberts, Sister (acting Matron) (206652), Queen Alexandra's Imperial Military Nursing Service.

Miss Mary Jamieson Thomson, Asst. Matron (206481), Queen Alexandra's Imperial Military Nursing Service.

Miss Eleanor Cartwright Key, Matron (213596), Territorial Army Nursing Service.

To be Associates of the Royal Red Cross, Second Class.

Miss Winifred Lizzie Aldwinckle, Nursing Officer (206599), Queen Alexandra's Imperial Military Nursing Service.

Miss Euphemia Barbara Black, Sister (206039), Queen Alexandra's Imperial Military Nursing Service.

Miss Florence Gwendolene Jones, Sister (Asst. Matron) (206249), Queen Alexandra's Imperial Military Nursing Service.

Miss Heather Jessie Kirkwood, Sister (Asst. Matron) (206263), Queen Alexandra's Imperial Military Nursing Service.

Miss Elsie Washington Kynaston, Sister (208586), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Dorothy Sinden, Sister (Asst. Matron) (206467), Queen Alexandra's Imperial Military Nursing Service.

Miss Elizabeth Marie Thomas, Sister (209504), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Ethel Winifred Rosalie Warner, Sister (Asst. Matron) (206526), Queen Alexandra's Imperial Military Nursing Service.

Miss Linda Bell, Sister (208024), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Kathleen Crago, Sister (206870), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss May Dobson, Sister-in-Charge (206923), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Mary Ann Kay, Sister (208590), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Cassandra Twitchin, Sister (209365), Queen Alexandra's Imperial Military Nursing Service (Reserve).

Miss Catherine Cunningham Fleming, Sister (213257), Territorial Army Nursing Service.

Miss Winifred Amy Miller-Hallett, Sister-in-Charge (221525), Territorial Army Nursing Service.

Miss Constance Robertson-Taylor, Sister (215309), Territorial Army Nursing Service.

Miss Frances Marjorie Taylor, Sister (215650), Territorial Army Nursing Service.

Miss Jessie Waive, Sister (215718), Territorial Army Nursing Service.

December 7, 1943.—War Subs. Lt.-Col. (temp. Col.) (acting Maj.-Gen.) C. M. Page, *D.S.O.*, M.B., F.R.C.S. (51065), relinquishes the acting rank of Maj.-Gen. Oct. 23, 1943.

War Subs. Lt.-Col. C. M. Page, *D.S.O.*, M.B., F.R.C.S. (51065), to be acting Maj.-Gen. Nov. 2, 1943.

Capt. (temp. Maj.) J. M. Carnow, M.B. (63946), to be Major Dec. 1, 1943.

Capt. A. L. Pennefather, M.B. (63159), to be Major Dec. 7, 1943.

December 10.—Lt.-Col. (temp. Col.) D. C. Scott, *O.B.E.* (8809), having attained the age for retirement is retained on the Active List supern. to establ. Dec. 9, 1943.

Major H. R. Edwards (8567) is restored to the rank of Lt.-Col. Jan. 27, 1942.

Major (temp. Lt.-Col.) J. M. Savage, M.B. (1644), to be Lt.-Col. Dec. 9, 1943.

December 14.—Major (temp. Lt.-Col.) H. A. Boyle, M.B. (15757), to be Lt.-Col. Aug. 15, 1942. (Substituted for the notifs. in *Gazette* (Supplements) dated Sept. 4 and Dec. 18, 1942.)

Major G. H. J. Brown, *D.S.O.*, M.B. (9970), ret.

pay, is restored to the rank of Lt.-Col. Dec. 1, 1943, on ceasing to be employed.

December 17.—Col. K. Comyn, M.D. (4596), late R.A.M.C., retires on ret. pay on account of ill-health. Dec. 17, 1943.

War Subs. Lt.-Col. (temp. Col.) (local Maj.-Gen.) W. H. Ogilvie, M.D., F.R.C.S. (131569), to be acting Maj.-Gen. May 5, 1943.

Lt.-Col. A. E. B. Jones, M.D. (11027), ret. pay, at his own request, reverts to the rank of Major, Dec. 1, 1943, whilst so employed.

December 21.—Major (War Subs. Lt.-Col.) (temp. Col.) G. K. Fulton, *M.B.E.*, M.B. (5070), to be Lt.-Col. Dec. 19, 1943.

December 24.—Lt.-Col. W. S. Martin, *M.C.*, M.B. (15687), having attained the age limit for retirement, is retained on the Active List supern. to establ. Dec. 19, 1943.

Regular Army Reserve of Officers.

General List.

December 10.—Lt.-Gen. Sir J. A. Hartigan, *K.C.B.*, *C.M.G.*, *D.S.O.*, M.B. (9990), late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. Nov. 30, 1943.

Regimental List.

Major A. I. F. Patterson (1083) *D.S.O.*, ceases to belong to the R.A.R.O. on account of ill-health. Nov. 4, 1943.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

T/Major T. P. Hopkins, Aegean.

Capt. J. Henry, Italy.

Capt. J. G. Hughes, Aegean.

Missing.

T/Lt.-Col. P. J. May, Aegean.

T/Major A. A. Byrne, Aegean.

T/Major G. B. Marsden, Aegean.

T/Major A. S. Till, Aegean.

Capt. J. M. Barber, Aegean.

Capt. W. Dorman, Aegean.

Capt. A. M. Forrest, Aegean.

Capt. S. Lask, Aegean.

Capt. S. T. McCartney, Aegean.

Capt. F. Murray, Aegean.

Capt. L. P. Owen, Aegean.

Capt. G. Pickering, Aegean.

Capt. D. W. Shannon, Aegean.

Capt. J. Zigmund, Aegean.

Lieut. A. P. Binks, Aegean.

Capt. R. M. Sharpe, at Sea.

Lieut. D. M. Baker, at Sea.

Lieut. R. A. Palmer, at Sea.

DEATHS.

SMITH, Lt.-Col. F. Died.

PURVES, Major W. H.—Died in Middle East.

SEDDON, Capt. J. C.—Killed in action, Aegean.

COOPER, Lieut. V. L.—Killed in action, Italy.

ROY, Capt. J. B.—Presumed killed in action.

ELMEZOR, Lieut. A. M.—Presumed killed in action.

A Link with the Past.

Major-General William James Fawcett, *C.B.*, M.B., died at his home in Lustleigh, on Dec. 1, 1943. Son of James Fawcett, J.P. of Lecarron, Co. Leitrim, he was born May 13, 1848. He was educated in the Isle of Man and at Trinity College, Dublin, where he took the B.A. and M.B. in 1870. Commissioned Assistant Surgeon April 1, 1871, he became Surgeon March 1, 1873, Surgeon Major April 1, 1883, Surgeon Lieutenant-Colonel April 1,

1891, Brigade Surgeon Lieutenant-Colonel April 24, 1895, Colonel R.A.M.C. May 10, 1899, and Surgeon General April 1, 1903. He retired May 13, 1908, on attaining the age of 60 years. He was re-employed Feb. 22, 1915, to Sept. 30, 1917, when his title was altered to Major-General. The alteration was not altogether to his liking, as he maintained that Surgeon was a distinction. He joined as a Regimental Medical Officer in the Royal Artillery and served with them at home and abroad, except for a short period with the 14th Hussars, until the regimental system was abolished in India in 1880. As the Senior Regimental Medical Officer serving in the station, he formed and for a time commanded the original British Station Hospital at Bangalore, in face of opposition and obstruction from other Regimental Medical Officers and those who disliked the passing of the old system. He served in the Suakim Campaign in 1885 as Medical Officer to

Headquarters, receiving the Medal with Clasp and Bronze Star. He took part in the Hazara campaign in 1888, being mentioned in despatches and receiving the Medal with Clasp. He was thanked by the Government of Bombay for his work in suppressing plague. At that time he commanded the British Station Hospital, Poona, and it is of interest that his name was still remembered in this connection in 1930. In 1899 he went to Cairo as Principal Medical Officer, Egypt; in 1903 to Dublin as Principal Medical Officer, Ireland. In 1904 he was created *C.B.* In 1905 he became Deputy Director-General under the late Sir Alfred Keogh. From 1915 till 1917 he was re-employed as President of Medical Boards, Northern Command, being brought to notice for valuable services rendered in connection with the war. He was always keen on professional work, and in his early days attained a reputation in Southern India as a Surgeon and especially as an anaesthetist in the days when the administration of chloroform in the tropics was considered a dangerous experiment. His reminiscences of experiences as a Regimental Officer were always of interest. Professional work was little and inclined to be secondary to regimental life. Malaria, typhoid, dysentery and cholera were accepted as inevitable. Hospitals were small and ill-equipped, often little more than a "Go-down" at the back of the lines. Surgical equipment might be limited to the "Pocket Case" which every Surgeon had to provide for himself on joining—scalpels with tortoiseshell handles and a catheter in three pieces which screwed together. Asepsis was still in its infancy. Treatment and nursing were in the hands of orderlies drawn from the regiment. Sick officers were treated in quarters—if lucky, nursed by the wives of brother officers. Moves were carried out by road—often months of the cold weather were spent on the march, moving three or four days a week and camping where sport or inclination dictated. The average length of life in India was short, and was not prolonged by imported beer and brandy with strong Trichinopoly cigars, of which they smoked their own length a day. Leave home was almost unknown, and many officers of the Army in India made their permanent home there. His early experiences of Bangalore proved to him the value of combining small medical units; in later years as *P.M.O.*, Ireland, he worked for the abolition of numerous small hospitals and the formation of large hospitals in central stations. In this work he had the advice of Sir Frederick Treves and Sir Charles Ball, an old friend of his student days. While *D.D.G.* the detailed work of forming the Medical Services of the newly-born Territorial Army fell to him. Of his thirty-two years' service he spent nearly twenty-six abroad. On retirement he returned to his old home in Co. Leitrim. He was appointed *J.P.* and *D.L.* of the County in 1911, and was High Sheriff in 1913. Public work, sport and farming kept him busy and young until 1922, when circumstances compelled him, to his great regret, to move again. He settled in Lustleigh, where he lived twenty-one years. A good judge of a horse and a good horseman, horses never appealed to him except as a means of locomotion. He disliked anything mechanical and took no interest in motoring. He was fond of shooting and a fine "Rough" shot, especially at snipe. He was proud of a record of twenty-three snipe for twenty-five cartridges before breakfast. His passion was fishing of any kind; when he was over eighty years old he would walk four miles with a climb of 600 feet, fish all day and walk home with

his bag of trout. When failing eyesight stopped sport and active life he read or was read to widely. Gifted with a retentive memory he became a store of the most varied knowledge.

Twice married, first to the daughter of Major-General (afterwards Lieutenant-General) W. T. Williams, secondly to the daughter of C. Lloyd, Esq., *J.P.*, who died six weeks before him. He is survived by his son, Colonel H. H. J. Fawcett, *D.S.O.*, late *R.A.M.C.*, Retired, and two daughters, Miss K. F. Fawcett, *R.R.C.*, Matron *Q.A.I.M.N.S.*, Retired, and Mrs. Delap, wife of Colonel G. G. Delap, *C.M.G.*, *D.S.O.*, late *R.A.M.C.*, Retired. Of his two grandsons, one is now a Captain *R.A.M.C.*, the other has recently qualified and hopes to join the *R.A.M.C.* within weeks. So an unbroken chain in the Medical Services of the Army extending over seventy-two consecutive years continues.

PHIPPS.—In Richmond, Surrey, on Dec. 15, 1943, Lieutenant-Colonel Edgar Vivian Ayre Phipps, *R.A.M.C.*, Retired. Son of the late Rev. G. W. Phipps, one time Rector of Husbands Bosworth, Market Harborough, he was born there on Feb. 3, 1857. He took the *M.R.C.S.* England, in 1880 and the *L.R.C.P.* London, in 1881. Commissioned Surgeon afterwards Surgeon Captain Feb. 3, 1883, he was promoted Surgeon Major Feb. 3, 1895, Lieutenant-Colonel *R.A.M.C.* Feb. 3, 1903, and retired May 27, 1903. He was re-employed at home during the Great War from Sept. 28, 1914, till Nov. 15, 1919. He performed exceptionally good service in Zululand in 1888. He served throughout the campaign in South Africa 1899-1902 with the 10th Hussars, taking part in the actions at Colesberg (Jan. 1 to Feb. 12, 1900), Relief of Kimberley, operations at Paardeberg (Feb. 17 to 26, 1900), actions at Poplar Grove, Dreifontein, Houtnek (Thoba Mountain), Vet River and Zand River. Also actions near Johannesburg, Pretoria and Diamond Hill. Thanked by the Commander-in-Chief, he was awarded the Queen's Medal with six Clasps, and the King's Medal with two Clasps. In Communique *W.O.* Sept. 18, 1917, he was brought to notice for valuable services rendered in connection with the Great War.

WHAITE.—On Dec. 15 in Northwood, Middlesex, Colonel Thomas Du Bedat Whaite, *C.B.*, *C.M.G.*, late *R.A.M.C.*, Retired. Son of the late Major John Edmund Whaite, 10th Foot (Lincoln Regt.), he was born in Fulwood, Lancs. July 7, 1862. Educated at Trinity College, Dublin, he took the *M.B.* in 1885. Commissioned Surgeon July 28, 1886, he was promoted Major *R.A.M.C.* July 28, 1898, Lieutenant-Colonel July 28, 1906, Colonel March 1, 1915, and retired July 7, 1919. He was Senior Medical Officer, Royal Arsenal, Woolwich, 1910 to 1914. He served in South Africa, taking part in the Relief of Kimberley, operations at Paardeberg (Feb. 17 to 26, 1900), action at Dreifontein, where he was severely wounded, and operations in Transvaal. He received the Queen's Medal with four Clasps and the King's Medal with two Clasps. He served in France from Aug. 26, 1914, till Nov. 22, 1917, and in Italy from Nov. 23, 1917, till March 5, 1919, as *A.D.M.S.* 1915-16, and as *D.D.M.S.* from 1916. Five times mentioned, he was created *C.B.*, *C.M.G.*, and awarded the French War Cross, 4th Class Order of St. Maurice and St. Lazarus, the 1914 Star, British War and Victory Medals.

NEWLAND.—In Bickington, North Devon, on Dec. 24, 1943, Major-General Sir Foster Reuss Newland, *K.C.M.G.*, *C.B.*, late *R.A.M.C.*, Retired. Born Jan. 10, 1862, he took the *M.B.Dublin*, in 1885, and the *M.D.* in 1931. Commissioned Surgeon July 28, 1886, he was promoted Major *R.A.M.C.* July 28, 1898, Lieutenant-Colonel July 28, 1906, Colonel March 1, 1915, Major-General Jan. 31, 1918, and retired Jan. 10, 1922. He took part in operations in Cape Colony, Orange River Colony and Transvaal in 1901 and 1902, being awarded the Queen's Medal with five Clasps. He served in France from July 21, 1915, till Oct. 28, 1917, and in Italy from Oct. 29, 1917, till March 25, 1919, as *A.D.M.S.*, *D.D.M.S.* and *D.M.S.* Seven times mentioned, he was created *C.M.G.*, *K.C.M.G.* and *C.B.*, and was awarded the 3rd Class Order of St. Maurice and St. Lazarus, 3rd Class Italian War Cross, Italian Silver Medal "al Merito della Sanita Publica," the 1914-15 Star, the British War and Victory Medals.

McLOUGHLIN.—On Dec. 27, 1943, Major-General

George Somers McLoughlin, *C.M.G.*, *D.S.O.*, late *R.A.M.C.*, Retired. Born in Mhow May 13, 1867, he took the *M.B.Durham*, in 1888, and was commissioned Surgeon July 29, 1890. Seconded under the Foreign Office for service in East Africa from June 18, 1897, till Nov. 30, 1899, he was promoted Major *R.A.M.C.* July 29, 1902, Lieutenant-Colonel Sept. 11, 1912, Colonel Dec. 26, 1917, and Major-General Jan. 27, 1922. He retired March 23, 1922. As Senior Medical Officer he was present at several engagements in Uganda in 1897 and 1898. Mentioned in despatches he received the *D.S.O.*, and for distinguished bravery the 3rd Class Brilliant Star of Zanzibar, also the Medal with two Clasps. He served in South Africa in 1900 and 1901, taking part in the operations in Natal in 1900, and operations in Transvaal and Orange River Colony, for which he received the Queen's Medal with four Clasps. In the Great War he served in France from Aug., 1914, till Sept., 1916, and in Macedonia June to Dec., 1917. Mentioned in despatches he was created *C.M.G.* and awarded the 1914 Star, British War and Victory Medals.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

FEBRUARY, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

December 23, 1943.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Sicily:—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Percival Ross Wheatley, M.B. (52033), Royal Army Medical Corps (Addington, Surrey).

The Military Cross.

Capt. (temp. Major) James Boyd McEwen, M.B. (91555), Royal Army Medical Corps (Edinburgh).

Capt. Guy Rigby-Jones, M.B. (216228), Royal Army Medical Corps (London, N.W.3).

Capt. John Rutherford, M.B. (122030), Royal Army Medical Corps (Joppa, Midlothian).

Capt. Derek Hughes Ridler (104446), The Army Dental Corps (Sidcup).

The Military Medal.

No. 7373608 S/Sjt. Eric George Stevens, D.C.M., Royal Army Medical Corps (High Barnet).

No. 7265224 Cpl. Stanley Tynan, Royal Army Medical Corps (Ashington, North'd).

No. 7870806 Pte. Victor Norman Winter, Royal Army Medical Corps (Hastings).

December 23.—The KING has been graciously pleased to approve the following award in recognition of distinguished services in Persia and Iraq:—

The Royal Red Cross.

To be Additional Member of the Royal Red Cross, First Class:—

Miss Sarah Elizabeth Ada Hardy (206182), Matron, Queen Alexandra's Imperial Military Nursing Service (Bournemouth).

December 23.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of distinguished services in Persia and Iraq:—

To be Additional Commander of the Military Division of the said Most Excellent Order:—

Major-Gen. (temp.) John Galbraith Gill, D.S.O., O.B.E., M.C., M.B. (8368), late Royal Army Medical Corps.

To be Additional Officer of the Military Division of the said Most Excellent Order:—

Col. (temp.) William Henry Arthur Douglas

Sutton (5041), Royal Army Medical Corps (Tunbridge Wells).

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant conduct in carrying out hazardous work in a very brave manner, to the undermentioned:—

No. 7258790 S/Sjt. Ernest Brewer, Royal Army Medical Corps (Wandsworth, London, S.W.8).

December 23.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of distinguished services in Persia and Iraq:—

Major (temp. Lt.-Col.) W. A. D. Drummond (31405).

Major D. J. O'Ryan (133630).

Capt. T. Tonai (205927).

7365648 Pte. J. D. Martin.

January 6, 1944.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the Middle East:—

To be Additional Commanders of the Military Division of the said Most Excellent Order:—

Brig. (local) George William Blomfield James, M.C., M.D. (135924), Royal Army Medical Corps.

Col. (temp.) Reginald Hutchinson Lucas, O.B.E., M.C., F.R.C.S. (15675), Royal Army Medical Corps.

Col. (temp.) Donald Charles Scott, O.B.E. (8809), Royal Army Medical Corps.

Brig. (temp.) Robert Fowler Walker, O.B.E., M.C., M.B. (22118), Royal Army Medical Corps.

To be Additional Officers of the Military Division of the said Most Excellent Order:—

Col. (temp.) Robert McKinlay, M.B. (8719), Royal Army Medical Corps.

Capt. (temp. Major) (acting Lt.-Col.) Robert James Valentine Pulvertaft, M.D., F.R.C.P. (157581), Royal Army Medical Corps (Tayvallich, Scotland).

To be Additional Members of the Military Division of the said Most Excellent Order:—

Capt. (temp. Major) Robert Blackwood Robertson, M.B. (72158), Royal Army Medical Corps.

Capt. (Qmr.) (temp. Major) Frederick George Summers (56542), Royal Army Medical Corps (Newtonmore, Scotland).

No. 7258010 W.O.I (Sjt.-Maj.) Frank William White, Royal Army Medical Corps (West End, Southampton).

January 6.—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant and distinguished services in the Middle East, to the undermentioned:—

No. 7263953 Sjt. John Pilling, Royal Army Medical Corps (Stretford, Manchester).

January 6.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Malta:—

To be Additional Officer of the Military Division of the said Most Excellent Order:—

Major (temp. Lt.-Col.) Reginald Ernest Tunbridge, M.D., M.R.C.P. (171571), Royal Army Medical Corps (Leeds, 6).

To be Additional Members of the Military Division of the said Most Excellent Order:—

Capt. John Richard Bolton (125277), Royal Army Medical Corps (Crownhill, Devon).

Capt. John Joseph Kempton, M.B. (102621), Royal Army Medical Corps (Bracknell, Berks).

January 6.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the Middle East:—

The Royal Red Cross.

To be Additional Members of the Royal Red Cross, First Class:—

Miss Mildred Elizabeth Harris, M.B.E. (206196), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Portishead, Somerset).

Miss Isabella Bingham Hazlett (206207), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Moville, Co. Donegal).

Miss Agnes Christine Mills (206293), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (West Malling, Kent).

Miss Linda Mary Pickering (206378), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Hawarden, Chester).

Miss Florence Mary Powell (206372), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Llannon, Carmarthenshire).

Miss Lilian Maud Rose (206411), Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Woking).

Miss Alice Marian Woolerton (215869), Matron, Territorial Army Nursing Service (Grantham).

January 13.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

The Distinguished Service Order.

Major (temp. Lt.-Col.) William Lyle Brown, M.B. (74826), Royal Army Medical Corps (Gateshead-on-Tyne).

Bar to the Military Cross.

Capt. (temp. Major) Martin Edward Meakin Herford, M.B.E., M.C., M.B. (175256), Royal Army Medical Corps (Reading).

The Military Medal.

No. 7370556 Cpl. Henry Frank Jessup, Royal Army Medical Corps (Streatham).

January 13.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Sicily:—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Ian Fraser, O.B.E., M.D., F.R.C.S. (125832), Royal Army Medical Corps (Belfast).

January 13.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the Middle East:—

Commands and Staff.

Brig. (temp.) J. Walker, C.B.E., M.C., M.B. (1310), late R.A.M.C.

Col. H. J. A. Longmore, M.B. (87003), late R.A.M.C.

Royal Army Medical Corps.

Brig. (acting) J. M. Macfie, O.B.E., M.C., M.B. (14140).

Brig. (local) D. McAlpine, M.D., M.R.C.P. (183202).

Col. (temp.) D. Mackie, M.C., T.D., M.B. (25954).

Col. (temp.) D. McVicker, M.C., M.B. F.R.C.S. (14146).

Col. (temp.) F. R. H. Mollan, O.B.E., M.C. (5666).

Col. (temp.) I. M. Pirrie, M.C., M.D. (313).

Col. (temp.) W. Russell, M.C., M.B. (15662).

Col. (acting) C. Donald, M.B., M.S., F.R.C.S. (125027).

Col. (acting) C. E. Eccles (35619).

Col. (acting) R. Marnham, F.R.C.S., M.R.C.P., M.R.C.S. (133609).

Major (temp. Lt.-Col.) I. Aird, M.B., F.R.C.S. (77284).

Major (temp. Lt.-Col.) C. Bainbridge, M.B. (123118).

Major (temp. Lt.-Col.) A. MacC. Campbell, M.B. (41791).

Major (temp. Lt.-Col.) A. M. Critchley, M.D. (77093).

Major (temp. Lt.-Col.) C. R. Croft (42311).

Major (temp. Lt.-Col.) C. D. Evans, M.B. (31739).

Major (temp. Lt.-Col.) J. C. Hawksley, M.D., F.R.C.P. (115478).

Major (temp. Lt.-Col.) R. Johnston, M.B. (52437).

Major (temp. Lt.-Col.) P. J. Jory, D.S.O., M.B., F.R.C.S. (128235).

Major (temp. Lt.-Col.) J. M. Matheson, M.B. (69803).

Major (temp. Lt.-Col.) T. Parr, M.D. (8723).

Major (temp. Lt.-Col.) T. McK. Robb (62921).

Major (temp. Lt.-Col.) J. R. Robertson (58936).

Major (temp. Lt.-Col.) E. J. Selby (104011).

Major (temp. Lt.-Col.) W. L. Spencer-Cox, M.C. (24005).

Capt. (temp. Major) (acting Lt.-Col.) S. Brown, M.B. (66472) (Killed in action).
 Capt. (temp. Major) (acting Lt.-Col.) F. C. Mayo (86981).
 Major (acting Lt.-Col.) D. H. Young, M.D., F.R.C.S. (65422).
 Major W. H. Milligan (88876).
 Capt. (Qmr.) (temp. Major) H. Bridges (125652).
 Capt. (temp. Major) J. H. L. Easton, M.D., M.R.C.P. (136693).
 Capt. (temp. Major) T. J. Guinan (102586).
 Capt. (temp. Major) T. G. S. James, M.B. (74437).
 Capt. (temp. Major) P. H. Jobson, M.B. (57141).
 Capt. (temp. Major) R. L. Macpherson, M.B. (89932).
 Capt. (temp. Major) R. J. Millbank (104974).
 Capt. (temp. Major) P. D. Stewart, M.B. (73570).
 Capt. (acting Major) S. A. Jenkins, M.B., F.R.C.S. (73554).
 Capt. (local Major) A. S. Goddard, *M.M.* (144051).
 Lt. (Qmr.) (local Major) S. E. Lane (154193).
 Lt. (Qmr.) (local Major) A. H. Luetchford (171357).
 Capt. (Qmr.) H. W. W. Thorp (116890).
 Capt. J. P. Baird, M.B. (115469).
 Capt. S. H. Campbell (131216).
 Capt. W. G. Graham, M.B. (101979).
 Capt. A. P. Grant, M.B. (173008).
 Capt. J. N. T. Hutton, M.B. (107214).
 Capt. D. H. Jones (133129).
 Capt. M. W. Lloyd-Owen, M.B. (89102).
 Capt. H. K. Lucas, M.B. (127678).
 Capt. D. D. Muir (123108).
 Capt. C. F. Murison, M.B. (100997).
 Capt. R. L. Orchardson, M.B. (91026).
 Capt. W. D. B. Pettigrew (90640).
 Capt. D. B. Ramsay, M.B. (188649).
 Capt. E. R. B. Reynolds (199990).
 Capt. D. R. Sanderson (150034).
 Capt. L. A. Shammass (191304).
 Capt. H. G. Skinner, M.B. (111584).
 Capt. F. M. Smith, *M.C.* (110692).
 Capt. G. A. Stephen, M.B. (125017).
 Capt. J. W. M. Sutherland, M.B. (75849).
 Capt. D. J. Waterston, *M.B.E.*, M.B. (90095).
 Capt. D. R. P. Wilkie (131033).
 Capt. C. A. Young, M.D., M.R.C.P. (211500).
 Capt. C. F. Young, *M.C.* (128862).
 Lt. (temp. Capt.) T. Wright, M.B. (171213).
 Lt. (Qmr.) J. T. Britton (154218).
 Lt. (Qmr.) F. J. Humble (205080).
 7260006 W.O.I (S.M.) W. Paterson.
 7258654 W.O.I (S.M.) A. J. Wilson.
 7261478 W.O.II (Qm.-Sjt.) D. P. Bullough.
 7519271 W.O.II (Qm.-Sjt.) E. V. Reading.
 7257898 W.O.II (Qm.-Sjt.) E. L. Yates.
 7260300 S/Sjt. T. Y. Brown.
 7256814 S/Sjt. H. Newton.
 7262604 S/Sjt. A. W. Smith.
 7517836 Sjt. (acting S/Sjt.) S. Garner.
 4857010 Sjt. H. Bedford, *B.E.M.*
 7262908 Sjt. B. P. Byrne.
 7379125 Sjt. C. F. Garland.
 7259672 Sjt. E. G. Hawkes.
 7349777 Sjt. R. Hosker.
 7358030 Sjt. C. Lewis.

7516203 Sjt. R. S. Lomer.
 7535409 Sjt. W. J. Mills.
 7256963 Sjt. J. Milton.
 7263920 Sjt. R. L. O'Connor.
 7368488 Sjt. W. D. Pitchford.
 7249838 Sjt. R. Reed.
 7519913 Sjt. S. R. G. Stuart.
 7348670 Cpl. (acting Sjt.) F. H. Acott.
 7375163 Cpl. (acting Sjt.) K. A. Batty.
 7354930 Cpl. (acting Sjt.) J. T. W. Crowe.
 7356818 Cpl. (acting Sjt.) N. H. Saunders.
 7263560 Cpl. (acting Sjt.) J. J. Simpson.
 7264135 Cpl. (acting Sjt.) J. Sneddon.
 7519536 Cpl. F. Batley.
 7263232 Cpl. W. H. Bissell.
 4266829 Cpl. R. Dobson.
 7369365 Cpl. A. P. Gardner.
 7266643 Cpl. D. F. Harding.
 7265622 Cpl. W. H. McCulloch.
 7260922 Cpl. W. White.
 7260730 Cpl. G. W. Wilson.
 7371255 L/Cpl. J. W. Blanchard.
 552835 L/Cpl. J. Lawson.
 7370270 L/Cpl. L. Matonti.
 7378244 L/Cpl. C. E. Rule.
 7354542 L/Cpl. F. L. Smith.
 2870722 Pte. (acting Cpl.) R. H. Johnston.
 7363951 Pte. R. A. F. Burnham.
 7267057 Pte. J. E. Burrow.
 7266044 Pte. J. B. Calcutt.
 7519799 Pte. M. Corcoran.
 7366086 Pte. W. Dickinson.
 7359177 Pte. T. Dunbar.
 7371517 Pte. J. Frudd.
 7365658 Pte. J. Hobson.
 3242999 Pte. S. Kirkwood.
 7354545 Pte. H. Knowles.
 7366870 Pte. J. Love.
 7369144 Pte. W. D. Martin.
 7259943 Pte. H. Mulligan.
 2653598 Pte. V. J. Murphv.
 7385570 Pte. I. J. Newman.
 7363795 Pte. W. H. Potts.
 7347377 Pte. J. Price. (Died of wounds.)
 7369555 Pte. J. A. Shields.
 7363815 Pte. C. L. Wood.

Queen Alexandra's Imperial Military Nursing Service.

Miss A. F. Adamson, Sister (206003).
 Miss C. M. Baugh, Sister (227689).
 Miss C. M. Bokenham, Sister (206060).
 Miss M. G. Brown, Sister (208149).
 Mrs. D. E. Bulgin, Sister (206707).
 Miss E. Clarke, Sister (206827).
 Miss M. E. Davidson, Sister (206994).
 Miss B. M. Fitzpatrick, Sister (206751).
 Miss L. Hunter, Sister (208462).
 Miss J. N. Johnston, Sister (208525).
 Miss W. D. McCracken, Sister (208787).
 Miss A. Oliver, Sister (208962).
 Miss E. D. Porter, Sister (209010).
 Miss E. F. Shine, Sister (206458).
 Miss J. F. Terrv, Sister (209358).
 Miss E. M. Waton, Sister (209622).

Territorial Army Nursing Service.

Miss C. M. Allen, Sister (209732).
 Miss G. Brown, Sister (209913).
 Miss E. A. Clarke, Sister (209975).
 Miss M. Elphick, Sister (213182).
 Miss E. E. Gregg, Sister (213377).
 Miss A. H. D. Hamilton, Sister (213407).
 Miss S. E. Livingstone, Sister (213773).

Miss A. McHardy, Sister (213888).
 Miss A. J. Ritchie, Sister (215298).
 Miss N. M. Saunders, Sister (215427).
 Miss E. G. Selmes, Sister (215412).
 Miss N. M. S. Shepherd, Sister (215435).
 Miss H. Thompson, Sister (215576).
 Miss S. Turner, Sister (215623).

January 20.—The KING has been graciously pleased to confer the Efficiency Decoration upon the following officers of the Territorial Army:—

Col. H. A. B. Whitelocke, M.B., F.R.C.S. (late R.A.M.C.) (24497).
 Lt.-Col. (T/Col.) W. H. Marston, M.B. (40137).
 Lt.-Col. T. F. Arnott, *O.B.E.*, M.B. (45342).
 Lt.-Col. S. J. Hartfall (39336).
 Major (T/Lt.-Col.) J. A. Bruce, M.B., F.R.C.P. (25171).
 Major (T/Lt.-Col.) F. Heywood-Jones, M.B. (38283).

Major H. W. Davies (38787).
 Major L. F. Jeffcoat (T.A.R.O.) (27311).
 Major C. R. L. E. Orme (33967).
 Major L. F. Richmond (47948).

January 27.—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India, to the undermentioned:—

No. 7260569 Sjt. Thomas Henry Bamford, Royal Army Medical Corps (London, S.E.9).

January 27.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

The Military Cross.

Lt. (W/S Major) Andrew Kenneth Dougall, M.B. (87623), Royal Army Medical Corps (Dunstable, Exeter).

Capt. Phillip McLean Gunn, M.B. (128655), Royal Army Medical Corps (Wirral).

Capt. James William Thomas Pretsell, M.B. (230081), Royal Army Medical Corps (Hawick, Scotland).

The Distinguished Conduct Medal.

No. 7374502 Sjt. Frank Thomas Verdun Symons, Royal Army Medical Corps (Torquay).

The Military Medal.

No. 7260570 Cpl. (acting Sjt.) Ernest Catherall, Royal Army Medical Corps.

No. 13013302 L/Cpl. George Henry Triggs, Royal Army Medical Corps (attd. Special Service Troops).

No. 987197 Pte. William Henry Marsh,

Royal Army Medical Corps (Kingsteignton, Devon).

No. 7402326 Pte. Pearson Rigg, Royal Army Medical Corps (attd. Special Service Troops) (Newcastle-on-Tyne).

January 27.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in North Africa:—

Col. (temp.) G. A. Walmsley, M.B. (36788).
 Capt. L. MacD. Reid (136699).

December 31, 1943.—Capt. D. W. Bell, M.B. (75597), short service commn. is appointed to a permanent commn. and to retain his present seniority, Dec. 28, 1943.

Short Service Commission.—Lt. T. Bird (254125) to be Capt., Dec. 19, 1943.

January 4, 1944.—Capt. E. T. St. M. Brett (68167) retires on account of ill-health, Jan. 4, 1944.

January 7.—The surname of Major J. M. Savege, M.B. (1644), is as now described and not as notified in *Gazette* (Supplement) dated Dec. 10, 1943.

Lt. (Qmr.) W. V. Dixon (74043) to be Capt. (Qmr.), Jan. 8, 1944.

January 11.—Lt. (Qmr.) W. R. Day, *M.B.E.* (74091) to be Capt. (Qmr.), Jan. 11, 1944.

Capt. H. H. Johnston (78769) retires on account of ill-health, Dec. 4, 1943. (Substituted for the notifi. in *Gazette* (Supplement) dated Dec. 3, 1943.)

January 18.—Capt. H. L. Thompson (37890) (Major (Qmr.), ret. pay, late R.A.M.C.), is restored to the rank of Major (Qmr.), Sept. 16, 1943.

January 21.—Major R. R. Evans, M.D. (10620), to be Lt.-Col., Dec. 19, 1943.

January 25.—Lt. (Qmr.) H. W. M. Stewart (74090) to be Capt. (Qmr.), Jan. 8, 1944.

War Subs. Major (temp. Lt.-Col.) (acting Col.) A. E. Porritt, *O.B.E.*, M.B., M.S., F.R.C.S. (125494), R.A.M.C., to be a Consultant, and is granted the local rank of Brigadier, Dec. 18, 1943.

January 28.—Capt. J. G. M. A. Brunet (64091) to be Major, Jan. 4, 1944.

Regular Army Reserve of Officers.

January 4, 1944.—Major W. A. Rankin (15737), from The Army Dental Corps, to be Major, retaining his present seniority, Jan. 1, 1944.

January 7.—Major A. F. L. Shields (34085) to cease to belong to the Royal Army Reserve of Officers on account of ill-health, Jan. 5, 1944, and to be granted the hon. rank of Lt.-Col.

THE ARMY DENTAL CORPS.

December 31, 1943.—The notifi. regarding War Subs. Capt. G. M. Brander (93361) in *Gazette* (Supplement) dated June 8, 1943, is cancelled.

January 11, 1944.—Capt. (temp. Major)

K. H. Coulton (62228) to be Major, Jan. 12, 1944.

Capt. (Qmr.) J. F. Hughes (18674) ret. pay (late R.A.M.C.), to be Bt. Major (Qmr.), Jan. 11, 1944.

TERRITORIAL ARMY.

December 31, 1943.—Capt. M. A. Butler, *M.B.E.*, *D.C.M.*, *M.M.* (45372), is restored to

the rank of War Subs. Major (Qmr.), Oct. 18, 1943.

TERRITORIAL ARMY RESERVE OF OFFICERS.

December 31, 1943.—Lt.-Col. and Bt.-Col. J. A. Stenhouse (25963), *T.D.*, M.B., having

attained the age limit, relinquishes his commission, retaining his rank, Dec. 14, 1943.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

THE Committee of the Royal Army Medical Corps Comforts Guild would like to thank all ranks of the Corps most sincerely for their magnificent donations to this fund, in response to Lady Hood's recent appeal on behalf of our Prisoners of War. Several appreciative letters have been received from repatriated personnel thanking the Committee for their quarterly personal parcels.

A gift parcel of 200 cigarettes per head was sent in December to our prisoners of war in German hands at the cost of £185. A cheque from the Guild for £500 was sent last month to the British Red Cross Society Prisoners of War Fund.

The following subscriptions from the various Commands and Units have been received:—

*R.A.M.C. Headquarters Mess,
Millbank,
London, S.W.1.*

October

	£	s.	d.
Officers and O.R.s, C.R.S., Brighton	5	0	0
105 Gen. Hospital	10	0	0
119 Mil. Convalescent Depot	96	6	2
N.C.O.s and Men, Mil. Hosp., Glasgow	20	0	0
12 Holding Depot	25	0	0
17 Co. R.A.M.C.	25	5	0
15 Co. R.A.M.C.	9	0	0
Staff, Leatherhead E.M.S. Hosp.	11	0	0

November

Mil. Hosp. (Head Injuries), Oxford	52	10	0
Staff, Army School of Hygiene	50	0	0
Mil. Isolation Hosp., Aldershot	5	5	0
Queen Elizabeth Nursing Home, Sevenoaks	2	0	0
25 Gen. Hosp.	21	0	0
Staff, Ashurst Mil. Hosp., Oxford	5	5	0
1 Co. R.A.M.C.	20	0	0
2 Co. R.A.M.C.	14	12	9
Unit Concert, 105 Gen. Hosp.	12	12	0
195 Air-ldg. Fd. Amb.	5	5	0
Military Hosp., Penshurst	5	0	0
Staff, C.R.S., Eastmore, Yarmouth	5	0	0
4 Co. R.A.M.C.	10	0	0
118 Mil. Convalescent Depot	2	10	0
7 Light Fd. Amb.	28	1	6
Northern Command, p.p. Mrs. Mitchiner	120	0	0
Staff, C.R.S., Ightham Warren	3	0	0
Officers and Men, 11 Light Fd. Amb.	10	10	0
14 Ambulance Train	15	5	6
32 C.C.S.	5	5	0
178 Fd. Ambulance	15	0	0
C.R.I., Newham	6	12	6
Mil. Wing, E.M.S. Hosp., Har- ringhes	16	1	8
C.R.S., Lockerbie	2	0	0
D. Wing and E.M.S. Hosp., Gail- lock	20	0	0
C.R.S., Castle Toward	2	2	0
Mil. Wing, E.M.S. Hosp., Law	2	2	0

	£	s.	d.
Mil. Wing, E.M.S. Hosp., Bal- lockinge	10	0	0
A.D.M.S. Office, W. Scotland Dis- trict	5	0	0
Mil. Hosp., Dumfries	13	0	0
Mil. Wing, E.M.S. Hosp., Stobhill	23	0	0
57 Home Ambulance Train	1	0	0
Moston Hall Mil. Hospital	19	5	6
Sjts.' Mess, Army School of Hygiene	3	5	6
2 Co. R.A.M.C.	2	9	1
22 Co. R.A.M.C.	10	0	0

December

35 Fd. Hygiene Section	1	1	0
39 Fd. Hygiene Section	8	0	0
Officers' Mess, Mil. Hosp., Davy- hulme	14	0	6
2 Co. R.A.M.C.	5	3	4
157 Fd. Amb.	10	3	9
9 Fd. Amb.	20	0	0
75 Gen. Hosp.	25	0	0
10 Fd. Amb.	20	0	0
223 Fd. Amb.	10	0	0
Officers' Mess, 223 Fd. Amb.	4	0	0
26 Fd. Hygiene Section	3	3	0
27 Fd. Dressing Station	19	0	0
Mil. Wing, E.M.S. Hosp., Larbert	25	6	0
Mil. Hosp., Carstairs	15	0	0
C.R.S., Garemont and Shandon	3	5	6
Mil. Hosp., Inveraray	76	0	0
Astley Ainslie Institution	5	0	0
Mersey Sub-District (Church Parade)	3	0	0
8 Fd. Amb.	27	0	0
106 Gen. Hosp.	25	0	0
20 Fd. Dressing Station	2	2	0
All Ranks R.A.M.C., in E. Central District	56	6	1
4 Co. R.A.M.C.	50	0	0
Medical Units, 9 Beach Group	18	0	0
Officers and O.R.s, 16 Light Fd. Amb.	25	16	3
Officers and O.R.s, 31 Fd. Dressing Station	2	4	9
Officers and O.R.s, 12 Fd. Dressing Station	1	1	0
Staff, H.Q., S.E. Command	40	1	0
Command Med. Store, Tidworth	4	5	0
Officers and Men, 17 Fd. D. Station	5	0	0
Officers and Men, 30 Fd. D. Station	8	10	0
Sjts.' Mess, No. 1 Depot, R.A.M.C.	20	0	0
16 Fd. Dressing Station	2	0	0
160 Fd. Ambulance	10	10	0
19 Fd. Dressing Station	40	0	0
1 A.A. Co. R.A.M.C.	6	5	0
126 Mil. Convalescent Depot	8	8	0
24 (London) General Hospital	167	18	0
155 Fd. Ambulance	30	0	0
32 Fd. Hygiene Section	7	7	0
Mil. Hosp., Chartham	10	10	0
Officers and O.R.s, 9 Fd. D. Station	31	10	0
Personnel, 2nd A.A. Group	86	14	0
11 Fd. Dressing Station	27	14	6
Mil. Hosp., Drymen	45	10	0
74 Gen. Hosp.	10	10	0
C.R.S., Paisley	1	12	6

	£	s.	d.		January	£	s.	d.
101 Convalescent Depot	10	0	0	Units in S. Highland District ...	600	0	0	
110 Gen. Hospital	3	15	8	Oldmill E.M.S. Hosp.	25	0	0	
20 Co. R.A.M.C.	2	2	0	Army School of Hygiene	1	9	2	
P.R.I., No. 1 Depot, R.A.M.C. ...	50	0	0	Units in Western Command ...	611	6	10	
Cpls.' Mess, No. 1 Depot, R.A.M.C.	30	0	0	4 Co. R.A.M.C., V.A.D.s and				
171 Fd. Ambulance	25	0	0	A.T.S.	50	12	6	
O.R.s, H.Q. Office, E. Command ...	24	2	0	32 Fd. Dressing Station	7	6	10	
86 Gen. Hospital	5	7	2	110 Gen. Hospital	3	1	9	
Units in N. Command, p.p. Mrs.				Sjts.' Mess, No. 1 Co. R.A.M.C. ...	4	5	9	
Mitchiner	132	13	0	O.R.s, No. 13 Co. R.A.M.C. ...	10	0	0	
187 Fd. Ambulance	10	0	0	Staff, War Office, p.p. Major Bull	10	0	0	
Units in N. Highland District ...	37	15	0	Staff, War Office (A.M.D.2/Stats.),				
224 (Para.) Fd. Ambulance	3	13	6	p.p. Capt. Tippet	10	10	0	
18 Fd. Dressing Station	3	0	0					
91 Gen. Hosp.	20	0	0					

PRISONERS OF WAR [AND MISSING.

Prisoners of War.

T/Major A. S. Till, Ægean.
Capt. A. M. Forrest, Ægean.
Capt. S. Lask, Ægean.

Capt. T. M. Park, Italy.

Missing.

Capt. J. C. Seddon, Ægean.

DEATHS.

WOODS.—On Dec. 17, 1943, Lieutenant-Colonel Charles Rolleston Woods, R.A.M.C., M.D., Retired. Born Feb. 6, 1854, he took the M.B. Dublin in 1876 and proceeded to the M.D. in 1879. He took the F.R.C.S.I. in 1881, and the D.P.H. Cambridge, in 1888. Commissioned Surgeon July 31, 1880, he was promoted Surgeon Major July 31, 1892, Lieutenant-Colonel, R.A.M.C., July 31, 1900, and retired July 27, 1907, when he took up the Retired Pay appointment of M.O. i/c. Detention Barracks, Dublin, which he held till Sept. 30, 1908. From Oct. 1, 1908, till Jan. 31, 1918, he was M.O. i/c. Troops at Birr. He took part in the Manipur Campaign of 1891, being awarded the Medal with Clasp.

DAVOREN.—On Jan. 23, 1944, in Redhill, Major Vesey Henry William Davoren, R.A.M.C., Retired. Born Sept. 13, 1862, he took the L.R.C.S.I. in 1884 and the L.R.C.P.I. in 1886, and entered the Service as Surgeon July 27, 1887. Promoted Major, R.A.M.C., July 27, 1899, he retired July 27, 1907, when he took up the Retired Pay appointment at Bury St. Edmunds and held it until May 11, 1919. He was a keen Mason.

HARRISON.—On Jan. 25, 1944, in Outwood, Redhill, Colonel Charles Edward Harrison, C.M.G., C.V.O., M.B., F.R.C.S. Son of late Surgeon Major John Harrison, Grenadier Guards, who served in the Peninsula and at Waterloo, he was born in Kensington on Oct. 19, 1852. Educated at Wellington College, St. Bartholomew's Hospital and London University, he took the M.B. with honours in 1876, and the F.R.C.S. in 1878. Appointed Surgeon, A.M.D., in 1874, he was gazetted to the Grenadier Guards in 1875. He was promoted Surgeon Major, Grenadier Guards in 1885, Brigade Surgeon Lieutenant-Colonel, Brigade of Foot Guards (the last Brigade Surgeon, Brigade of Foot Guards) in November, 1891. He was appointed Honorary Surgeon to the King and received

the Brevet of Colonel March 13, 1907. He was the first O.C. Queen Alexandra's Military Hospital, Millbank, which he commanded from 1905 till 1909. He retired Oct. 18, 1909, just over a century after his father was gazetted Assistant Surgeon 1 Foot (afterwards Grenadier) Guards on June 29, 1809. He was created C.V.O. in 1909. He became O.C. 1 London (City of London) General Hospital, T.F., Oct. 19, 1909, and A.D.M.S. 2 London Division, T.A., April 1, 1912. He was transferred to the T.F. Reserve Jan. 30, 1918. He was appointed O.C. Prince of Wales' Hospital for Convalescent Officers, Great Central Hotel, Marylebone, 1916. He was Deputy Commissioner, Medical Services, Ministry of National Service and Ministry of Pensions, 1918, till 1920. A man of very great charm and courtesy whom it was no small privilege to know. Before Q.A. Military Hospital, Millbank, was opened and when each Guards Regiment had its own hospital and Medical Officers, his brother Guards Medical Officers looked on him as their consultant to their various hospitals. He was Hon. Secretary of the Committee of the Q.A. Military Hospital, Millbank, Chapel Committee, and for many years after retirement still took a very keen interest in it. He served in Egypt in 1882 and took part in the action at Mahuta and the battle of Tel-el-Kebir, being awarded the Medal with Clasp and Bronze Star. He served in France from July 19, 1915, till Oct. 3, 1916, as O.C. 23 General Hospital, American (Chicago) Unit. Mentioned in despatches, he was created C.M.G., and awarded the 1914-15 Star, British War and Victory Medals. The funeral took place on Friday, Jan. 28, at Redhill, with full military honours. Major-General O. W. McSheehy, C.B., D.S.O., O.B.E., represented the Director-General, Army Medical Services, and the Grenadier Guards sent an unarmed escort of Pall Bearers with Buglers, who sounded the Last Post and Reveille.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

MARCH, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

February 3, 1944.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire to the undermentioned repatriated prisoners of war, in recognition of gallant and distinguished services during and prior to captivity :—

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. Aveling Donald Aveling (104565), Royal Army Medical Corps (Colyton, Devon).

Capt. (temp. Major) William Eldon Tucker, F.R.C.S. (47828), Royal Army Medical Corps (Billingshurst, Sussex).

The KING has been graciously pleased to approve that the undermentioned repatriated prisoners of war be Mentioned in recognition of gallant and distinguished services in the field prior to their capture :—

Capt. P. A. Forsyth (101291).
7354033 W.O.II (Qm.-Sjt.) S. A. Williams.
7356485 S./Sjt. J. P. Chadwick.
7356414 S./Sjt. T. C. Erselius.
7349040 Sjt. B. C. Allcock.
7260581 Sjt. E. T. Gladden.
3704964 Sjt. W. E. Rowley.
7358668 Cpl. R. Allan.
7357848 Cpl. P. L. Crick.
7349333 Cpl. H. N. S. Wilkinson.
7349341 Pte. G. M. Bunting.

February 10.—The KING has been graciously pleased to give orders for the following promotion in the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the field :—

To be an Additional Knight Commander of the Military Division of the said Most Excellent Order :—

Maj-Gen. (temp.) Ernest Marshall Cowell, C.B., C.B.E., D.S.O., T.D., F.R.C.S. (2804), late Royal Army Medical Corps.

February 10.—The KING has been graciously pleased to approve of the following awards in recognition of gallant and distinguished services in Italy :—

The Distinguished Service Order.

Capt. (temp. Major) (acting Lt.-Col.) Archibald Crerar, M.C., M.B. (70322), Royal Army Medical Corps (Millport, Bude).

The Military Cross.

Capt. (temp. Major) David Lincoln Lewis, M.B. (223228), Royal Army Medical Corps (Shrewsbury).

The Military Medal.

7372554 Sjt. Stanley Frank Burrett, Royal Army Medical Corps (East Harling, Norfolk).

7362570 L. Cpl. Harold Wilson, Royal Army Medical Corps (Bedford).

7345335 Pte. John Berry, Royal Army Medical Corps (Welling).

7346027 Pte. Harry Hargreaves, Royal Army Medical Corps (London, N.W.3).

7375552 Pte. Thomas McGuire, Royal Army Medical Corps (Glasgow).

7374023 Pte. Eric Mills, Royal Army Medical Corps (Bradford).

February 10.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Burma :—

The Military Cross.

Capt. John Joseph Sumner, M.D. (248075), Royal Army Medical Corps (Leeds, 8).

February 15.—The KING has been pleased to grant unrestricted permission for the wearing of the following decorations, which have been conferred on the undermentioned officers and other ranks in recognition of distinguished services in the cause of the Allies :—

Decorations Conferred by the President of the United States.

Silver Star.

7394382 Pte. George Currie Neal, Royal Army Medical Corps.

Soldiers Medal.

7344530 Sjt. Alfred Henry Powell, Royal Army Medical Corps.

February 24. The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Military Cross.

Capt. Huw Morus Jones, M.B. (225721), Royal Army Medical Corps (Leamington Spa).

The Military Medal.

7400424 Cpl. George Earl Andrews, Royal Army Medical Corps (London, S.E.23).

3441967 Cpl. Samuel Ward, Royal Army Medical Corps (Clitheroe, Yorks).

7397469 Pte. Stanley Joseph Charles Jones, Royal Army Medical Corps (Port Talbot, Glam.).

March 2.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of gallant and distinguished service in the field :—

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Capt. (temp. Major) Norman Bruce Hall, M.B. (152435), Royal Army Medical Corps (Windlesham).

Miss Violet Mary Innes (213557), Sister, Territorial Army Nursing Service (Billingshurst).

The KING has been graciously pleased to approve the award of the George Medal, in recognition of conspicuous gallantry in carrying out hazardous work in a very brave manner in the field, to the undermentioned :—

14500040 Pte. Porter Jarrell, Royal Army Medical Corps.

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) to repatriated prisoners of war, in recognition of extreme devotion to duty, to the undermentioned :—

7344331 Pte. David Kelman, Royal Army Medical Corps (Dundee).

7343764 Cpl. Edward Lynch, Royal Army Medical Corps (Dundee).

7362606 Pte. John William Paterson, Royal Army Medical Corps (Brechtin, Angus).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in the field :—

The Military Medal.

14500039 Pte. Edward Welles, Royal Army Medical Corps.

March 9.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in Italy :—

The Military Medal.

7341164 S/Sjt. Mungo Love, Royal Army Medical Corps (Derby).

March 10.—The KING has been pleased to grant unrestricted permission for the wearing of the following decorations, which have been conferred on the undermentioned in recognition of distinguished services in the cause of the Allies :—

Decorations Conferred by His Imperial Majesty the Shahinshah of Iran.

The Order of the Crown, 4th Class.

Lt.-Col. (temp. Col.) Digny William Elliston Burridge (21939), Royal Army Medical Corps.

The Order of Humayun, 5th Class.

Matron Sarah Elizabeth Hardy (206182), Queen Alexandra's Imperial Military Nursing Service.

February 1.—Lt.-Col. (local Col.) R. McKinlay, M.B. (8719), is seconded under the Foreign Office, Dec. 6, 1943.

The promotions of the undermentioned Lt.-Cols. is antedated as follows :—

J. M. Savage, M.B. (1644), Dec. 6, 1943.

(Temp. Col.) G. K. Fulton, M.B.E., M.B. (5070), Dec. 9, 1943.

Lt.-Col. (temp. Col.) T. L. Fraser, O.B.E., M.B. (5607), having attained the age for retirement, is

retained on the Active List supern. to establ. Jan. 30, 1944.

Major (temp. Col.) A. R. Barlas, M.B. (9215), to be Lt.-Col. Jan. 30, 1944.

February 4.—Lt.-Col. (temp. Col.) J. C. Denvir, M.B. (19372), having attained the age for retirement, is retained on the Active List supern. to establ. Feb. 4, 1944.

Major (War Subs. Lt.-Col.) (temp. Col.) T. B. H. Tabuteau, M.B. (14361), to be Lt.-Col. Feb. 4, 1944.

February 8.—Col. H. N. Sealy, late R.A.M.C. (8102), having attained the age for retirement, is retained on the Active List supern. to establ. Feb. 7, 1944.

Lt.-Col. (temp. Col.) J. R. N. Warburton, M.C. (1036), from R.A.M.C., to be Col. Feb. 7, 1944, with seniority Oct. 28, 1940.

Major (War Subs. Lt.-Col.) (temp. Col.) E. P. N. Creagh, M.B., M.R.C.P. (15621), to be Lt.-Col. Feb. 7, 1944.

February 11.—Major D. F. Panton (15624) to be Lt.-Col. Feb. 11, 1944.

The undermentioned short service officers are appointed to permanent commns. retaining their present seniority :—

Feb. 1, 1944 :—

Capt. (temp. Major) I. B. Pirie, M.B. (85410).

Capt. (temp. Major) R. M. Hector, M.B. (85411).

Capt. (temp. Major) H. L. Wolfe (85412).

Capt. V. J. Keating, M.B. (85434).

Lt.-Col. W. S. Evans (15654) having attained the age for retirement, retires on ret. pay Feb. 11, 1944.

February 18.—The undermentioned short service officer is appointed to a permanent commn., retaining his present seniority :—

Capt. (temp. Major) J. F. D. Murphy, M.B. (85437), Feb. 1, 1944.

Memoranda.

Major W. J. E. Bell, D.S.O., M.B. (4714), Royal Army Medical Corps (ret. pay), is restored to the rank of Lt.-Col. on ceasing to be empld. on account of ill-health, Feb. 18, 1944.

February 22.—Lt.-Col. J. H. G. Hunter, M.B. (14364), from R.A.M.C. to be Col. Feb. 21, 1944, with seniority Feb. 9, 1940.

Lt.-Col. (temp. Col.) A. C. Jebb, M.C. (5670), from R.A.M.C. to be Col. Feb. 21, 1944, with seniority Jan. 3, 1941.

Lt.-Col. C. A. Slaughter (8133) on reaching the age for retirement, is retained on the Active List supern. to establ. Feb. 23, 1944.

Major (War Subs. Lt.-Col.) (temp. Brig.) G. E. MacAlevey, D.S.O., M.C. (15627), to be Lt.-Col. Feb. 21, 1944.

Major C. P. Chambers, M.B. (1891), to be Lt.-Col. Feb. 21, 1944.

Major (temp. Lt.-Col.) M. C. Paterson, M.C., M.B. (10314), to be Lt.-Col. Feb. 23, 1944.

February 25.—War Subs. Major (acting Col.) P. Wilcs, M.S., F.R.C.S. (227866) (R.A.M.C.), to be a Consultant, and is granted the local rank of Brig. May 18, 1943.

War Subs. Capt. (acting Col.) W. R. Russell, M.D., M.R.C.P. (122044) (R.A.M.C.), to be Consultant, and is granted the local rank of Brig. Sept. 2, 1943.

February 29.—Lt.-Col. T. I. Dun, D.S.O., M.C., M.B. (5530), from R.A.M.C. to be Col. Mar. 2, 1944, with seniority from Jan. 8, 1941.

Major (temp. Lt.-Col.) J. D'A. Champney (15683), to be Lt.-Col. Mar. 2, 1944.

March 3.—Col. (temp. Brig.) E. U. Russell, *M.C.* (4865), late *R.A.M.C.*, on completion of four years in the rank is retained on the Active List supern. to establt. Mar. 2, 1944.

War Subs. Major H. V. D'A. Iles (63205) to be Major Mar. 1, 1944.

March 7.—Col. (temp. Maj.-Gen.) J. G. Gill, *D.S.O.*, *O.B.E.*, *M.C.*, *M.B.* (8368), late *R.A.M.C.*, relinquishes the temp. rank of Maj.-Gen. Feb. 9, 1944.

March 10.—Lt.-Col. C. Popham, *O.B.E.* (8779), from *R.A.M.C.*, to be Col. Mar. 11, 1944, with seniority from Mar. 1, 1941.

Col. R. G. Shaw, *M.C.*, *M.B.*, late *R.A.M.C.* (4923), on completion of four years in the rank on Mar. 11, 1944, is retained on the Active List supern. to establt.

Major V. J. Pérez, *O.B.E.*, *M.D.* (15612), to be Lt.-Col. Mar. 11, 1944.

The undermentioned short service officers are apptd. to a permanent commn. retaining their present seniority :—

March 9.—Capt. (temp. Major) H. Jacobs, *M.B.* (89644).

March 11.—Capt. (temp. Major) T. McErvel, *M.B.* (75584).

Lt.-Col. (local Brig.) D. Fettes, *O.B.E.* (15746), relinquishes the local rank of Brig. Jan. 6, 1944.

War Subs. Major (temp. Lt.-Col.) (acting Col.) C. I. N. Morgan, *M.B.*, *F.R.C.S.* (188279), to be a Consultant, and to be granted the local rank of Brig. Dec. 4, 1943.

Regular Army Reserve of Officers.

March 3.—Bt. Major E. G. H. Cowen (51530) ceases to belong to the Res. of Oftrs. on account of ill-health Mar. 1, 1944, and is granted the hon. rank of Lt.-Col.

ROYAL ARMY MEDICAL COLLEGE.

RETIREMENT OF MR. E. J. SMITH.

Mr. E. J. Smith, who recently retired in his 68th year of age, was for thirty-three years a loyal, zealous, capable and efficient Laboratory Assistant in the Department of Tropical Medicine. Special permission was given for his service to be extended beyond the normal age for retirement, and but for ill-health supervening he might still be serving. Mr. Smith will be remembered most kindly and gratefully by a very large number of officers and other ranks who had the advantage of his teaching while undergoing courses of instruction at the College. His special subject was Entomology, in which he was a very good teacher and demonstrator endowed with the gift of imparting knowledge and of conveying his keenness and enthusiasm to those under his instruction. Shortly after his retirement the Commandant and all available past and present Professors and Assistant Professors of Tropical Medicine, under whom Mr. Smith had served, presented him with a cheque as a small token of the high regard in which he was held throughout the whole period of his service at the College.

Happily rest and a short spell of hospital treatment have brought him back to health. All who know him wish him Good Luck and the full enjoy-

ment for many years to come of a well-earned retirement.

DEATH OF MR. D. H. KIRTON AND OF MR. W. GIBBS.

We regret to record the recent death of Mr. D. H. Kirton and of Mr. W. Gibbs, both well known and much respected older members of the civilian staff of the Royal Army Medical College.

Mr. Gibbs retired some years ago, but Mr. Kirton was still serving and at duty in the College on the day he became ill and was removed to St. Thomas's Hospital where, shortly afterwards, he died somewhat suddenly. He gave twenty-four years' good and loyal service in the College.

Both Mr. Gibbs and Mr. Kirton will best be remembered by the more senior officers of the Corps.

Mr. Gibbs was a most efficient Laboratory Assistant and a first-rate photographer at the College for nearly twenty-two years.

Mr. Kirton was assistant curator of the Pathological Museum and his duties as such did not bring him much into association with officers' classes. In peace time, however, he was very well known and a great help to officers taking Surgery as their special subject.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

Capt. W. Dorman, Aegean.
Capt. R. P. Lawson, Aegean.
Capt. L. P. Owen, Aegean.
Capt. J. C. Seddon, Aegean.

Missing.

Lt.-Col. T. S. Eves, at Sea.
Capt. R. W. McNamara, at Sea.
Capt. J. R. O. Thompson, at Sea.
Capt. R. P. Lawson, Italy.

DEATHS ON ACTIVE SERVICE.

LANG, Capt. W. H. Died of wounds, Italy.
HARBISON, Capt. D. R. Killed in action, Italy.
PHILLIPS, Lt. J. Presumed killed in action, at sea.
GAMBLE, Capt. E. M. Died in India.

MATTHEWS, Capt. H. Presumed killed in action, at Sea.
SMITH, Capt. E. T. M. Died whilst Prisoner of War (accident).

LART, Capt. J. F. V. Killed in action, Italy.	PALMER, Lt. R. A. Presumed killed in action,
FOXTON, Lt.-Col. H. Presumed killed in action,	at Sea.
ADAM, Major G. A. H. Presumed killed in	BURNS, Capt. J. S. Died (accident), N. Africa.
action, at Sea.	LAUDER, Capt. H. Killed in action, Burma.

DEATH.

CONDON.—In Exmouth on Feb. 13, 1944, Colonel Edgar Hunt Condon, late R.A.M.C., Retired. Son of Surgeon Major Edmund Hunt Condon, A.M.D., he was born in India on Aug. 30, 1868. Having taken the M.B. Aberdeen, in 1891, he entered the Army as Surgeon Lieutenant July 27, 1892. Promoted Surgeon Captain July 27, 1895, Major R.A.M.C. July 27, 1904, Lieutenant-

Colonel March 1, 1915, and Colonel Dec. 26, 1917, he retired March 9, 1920. He served with No. 1 British General Hospital on the North-West Frontier of India in 1897 and 1898. He served in South Africa in 1901 and 1902, being awarded the Queen's Medal with Clasps, Cape Colony, Orange River Colony and Transvaal and South Africa 1901 and South Africa 1902.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS

Corps News.

APRIL, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

March 23, 1944.—The KING has been graciously pleased to give Orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Sicily :—

To be Additional Commanders of the Military Division of the said Most Excellent Order.

Col. (temp.) Arthur Austin Eagger, *O.B.E.* (40511) Royal Army Medical Corps.

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Col. (temp.) Charles Donald, *M.B., M.S., F.R.C.S.* (125027), Royal Army Medical Corps (London, W.1).

Capt. (temp. Major) Ewen Alistair Jack, *M.B., F.R.C.S.* (136633), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Pierce Lloyd-Williams, *T.D.* (7544), Royal Army Medical Corps (Bangor).

Major (temp. Lt.-Col.) Florence O'Driscoll, *M.B.* (107207), Royal Army Medical Corps) Skerries, Co. Dublin).

Major (temp. Lt.-Col.) William Arthur Robinson, *M.D.* (50009), Royal Army Medical Corps (Newbury, Berks).

Major (temp. Lt.-Col.) Hugh Leonard William Sixsmith, *M.B.E.* (116968), Royal Medical Corps (West Horsley, Surrey).

Major (temp. Lt.-Col.) William Leigh Spencer-Cox, *M.C.* (24005), Royal Army Medical Corps (Cheltenham).

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. (Qmr.) William Frank Bench (144140), Royal Army Medical Corps (Perivale).

Capt. (temp. Major) Reginald Bolton, *M.B., M.R.C.P.* (118116), Royal Army Medical Corps.

Capt. (local Major) Albert Stanley Goddard, *M.M.* (144051), Royal Army Medical Corps (London, S.E.23).

Capt. Harold Keith Lucas, *M.B.* (127678), Royal Army Medical Corps (High Wycombe, Bucks).

W.O. II (Qmr.-Sjt.) (7261086), Lawrence Mullins, Royal Army Medical Corps (Bradford).

Capt. (temp. Major) Leslie Frederic William Salmon (62962), Royal Army Medical Corps (Farnborough, Kent).

W.O. II (Qmr.-Sjt.) (7259051), acting W.O. I (Sjt.-Major) George Arthur Sunderland, Royal Army Medical Corps (Stranraer).

Capt. (Qmr.) Sydney John Talbot (150787), Royal Army Medical Corps (York).

March 23.—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant and distinguished services in Sicily, to the under-mentioned :—

7381695 Sjt. John Desmond Bellamy, Royal Army Medical Corps (Ashby-de-la-Zouch).

7362187 Pte. Harry Hunn, Royal Army Medical Corps (Barry Dock, S. Wales).

March 23.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Sicily :—

The Military Cross.

Capt. Andrew Noble, *M.B.* (185090), Royal Army Medical Corps (Stonehaven, Scotland).

Capt. Dennis Gerard Sheffield, *M.B.* (108446), Royal Army Medical Corps (Cosham, Hants).

The Royal Red Cross.

To be an Additional Member of the Royal Red Cross, First Class.

Miss Margaret Mary Mirireles (206308), Sister, Queen Alexandra's Imperial Military Nursing Service (Grantham).

The Military Medal.

No. 7373088 Pte. John George Hall, Royal Army Medical Corps (Houghton-le-Spring).

March 23.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in Italy :—

The Military Cross.

Capt. James Alexander Lyon Naughton (127286), Royal Army Medical Corps (Edinburgh, 6).

March 23.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in the field :—

The Military Cross.

Capt. Ernest Thom McCartney, *M.B., F.R.C.S.* (128666), Royal Army Medical Corps (Pinner, Middx.).

March 23.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Sicily :—

Commands and Staff.

Brig. (temp.) S. Arnott, *D.S.O., M.D.* (4215) late R.A.M.C.

Brig. (temp.) R. R. G. Atkins, *O.B.E., M.C., M.D.* (5754), late R.A.M.C.

Brig. (temp.) R. W. Galloway, *C.B.E., D.S.O.*
M.B. (5839), late R.A.M.C.
Brig. (temp.) E. Phillips, *C.B.E., D.S.O., M.C.*,
M.B. (8555), late R.A.M.C.

Royal Army Medical Corps.

Col. (temp.) W. M. Cameron, *O.B.E.*, M.B. (5585).
Col. (temp.) A. T. B. Dickson, *O.B.E.*, M.B.
(16079).
Major (temp. Lt.-Col.) (acting Col.) J. C. Gilroy,
M.B., M.R.C.P. (39087).
Major (temp. Lt.-Col.) A. McC. Campbell, M.B.
(41791).
Major (temp. Lt.-Col.) R. McI. Gordon, *D.S.O.*,
D.F.C., G.M., M.B. (37575).
Major (temp. Lt.-Col.) F. H. Hollingshead, M.B.
(40036).
Major (temp. Lt.-Col.) R. G. Keeling, *O.B.E.*,
M.B. (99411).
Major (temp. Lt.-Col.) C. H. Kerr, *D.S.O.*, M.D.
(99413).
Major (temp. Lt.-Col.) M. C. Paterson, *M.C.*,
M.B. (10314).
Capt. (temp. Major) J. W. L. Bain, M.B. (88157).
Capt. (temp. Major) L. Brill, M.B. (234476).
Capt. (temp. Major) G. C. Dansey-Browning
(65323).
Capt. (temp. Major) W. S. Harvey, M.B. (62899).
Capt. (temp. Major) F. C. Heatley, M.B. (133945).
Capt. (temp. Major) C. J. Longland, M.B.,
F.R.C.S. (236049).
Capt. (temp. Major) A. J. R. Lowdon, M.B.
(87796).
Capt. (temp. Major) M. M. Medine, *M.B.E.*, M.D.
(75594).
Capt. (temp. Major) C. J. B. Murray (135708).
Capt. (temp. Major) A. D. Wall, M.B., F.R.C.S.
(128255).
Capt. (acting Major) R. W. Jones, M.B. (115476).
Capt. A. Green, M.B. (152140).
Capt. D. C. Little M.B. (246334).
Capt. I. B. MacKay, M.B. (169052).
Capt. B. C. M. Palmer, M.B. (135417).
Capt. R. Paul M.B. (99690).
Capt. D. R. Sandison (150034).
Capt. A. L. Thorp, M.B. (169061), (died of
wounds).
7262047 S/Sjt. (acting W.O. II (Q.M.S.)) A. C.
Malone.
7356328 Sjt. R. H. Anderson.
7378821 Sjt. F. G. Tucker.
7264976 Cpl. S. H. Sharpe.
7384504 L/Cpl. H. R. Couling.
7369389 L/Cpl. T. Dowson.
7360704 L/Cpl. T. H. Fuge.
7376940 L/Cpl. W. Hill.
7365773 L/Cpl. W. D. Massie.
7388312 L/Cpl. A. Redin.
7369768 Pte. J. B. Blockley.
7385416 Pte. J. P. Bowyer.

*Queen Alexandra's Imperial Military Nursing
Service.*

Miss E. Prescott, Sister (acting Matron), (206381)
Miss A. A. M. Adkins, Sister (209690).
Miss E. F. Shine, Sister (206458).
Miss E. S. Steadman, Sister (209309).
Miss M. E. Thorpe, Sister (206489).

March 23.—The KING has been graciously
pleased to approve that the following be Mentioned
in recognition of gallant and distinguished services
in the field :—

Major (temp. Lt.-Col.) P. J. May, *M.B.E.*, M.B.
(45049).

Capt. (temp. Major) G. B. Marsden, M.B. (97461).
Lt. A. P. Binks, B.M. (260603).
7357858 W.O. II (Qmr.) J. F. Davey.
97000892 Pte. E. E. Cochrane.
7263106 Pte. J. Reed.
7343405 Pte. W. Waugh.

March 31.—The KING has been graciously
pleased to give orders for the following appointment
to the Most Excellent Order of the British Empire,
in recognition of gallant conduct in carrying out
hazardous work in a very brave manner :—

*To be Additional Member of the Military Division of
the said Most Excellent Order :—*

Capt. Stuart Douglas Stock, M.B. (244953), Royal
Army Medical Corps (London, S.W.1).

April 6.—The KING has been graciously pleased
to approve the following awards in recognition of
gallant and distinguished services in Italy :—

The Military Cross.

Capt. (temp. Major) John Swinney, M.D.,
F.R.C.S. (94924), Royal Army Medical Corps.

The Military Medal.

7347033 Cpl. William Walker, Royal Army
Medical Corps (Aberdeen).

7518730 L/Cpl. Robert Hall, Royal Army
Medical Corps (Alva, Clackmannanshire).

7371192 Pte. William Victor Hardy, Royal
Army Medical Corps (Doncaster).

April 6.—The KING has been graciously pleased
to approve that the following be Mentioned in
recognition of gallant and distinguished services in
the Middle East :—

Maj.-Gen. (acting) W. H. Ogilvie, M.D., F.R.C.S.
(131569).

Brig. (local) D. E. Bedford, M.D., F.R.C.P.
(104568).

Brig. (local) G. MacDonald, M.D. (111634).

Brig. (local) S. Smith, M.B., F.R.C.P., K.H.P.
(14376).

Col. (temp.) R. Murphy, M.B. (24226).

Col. (temp.) C. Popham, *O.B.E.* (8779).

Col. (temp.) A. E. Richmond, *O.B.E.* (9946).

Col. (acting) T. S. Law, M.B. (22297).

Major (temp. Lt.-Col.) P. Carney, *M.C.*, M.B.
(15688).

Major (temp. Lt.-Col.) J. B. George, M.B. (53428).

Major (temp. Lt.-Col.) J. S. Jeffrey, M.D.,
F.R.C.S. (108724).

Major (temp. Lt.-Col.) C. A. Levy, M.R.C.S.
(40884).

Major (temp. Lt.-Col.) N. MacLeod, M.B. (282334).

Major (temp. Lt.-Col.) J. E. Measham, M.D.
(4254).

Major (temp. Lt.-Col.) J. S. Miller, M.B. (70364).

Major (temp. Lt.-Col.) R. W. Scott, M.B. (56533).

Major (temp. Lt.-Col.) A. P. Trimble, M.B.
(52780).

Major (temp. Lt.-Col.) H. L. Wallace, M.B.
(103160).

Capt. (temp. Major) (acting Lt.-Col.) J. Pyle,
M.C., M.B. (128256).

Capt. (temp. Major) K. G. A. Barlow, *M.B.E.*,
M.B. (127189).

Capt. (temp. Major) A. Crerar, *D.S.O.*, *M.C.*, M.B.
(70322).

Capt. (temp. Major) G. C. Dansey-Browning
(65323).

Capt. (temp. Major) W. S. Gale, M.B., (87626).

Capt. (Qmr.) (temp. Major) W. J. Jolly (99212).

Capt. (temp. Major) A. G. R. Lowdon, M.B.
(87796).

Capt. (temp. Major) J. D. MacLennan, M.D. (107958).
 Capt. (temp. Major) H. A. Palmer, M.B. (112649).
 Capt. (temp. Major) L. S. Rogers, M.B.E., M.B., F.R.C.S. (131335).
 Capt. (temp. Major) I. Urquhart, M.B. (181428).
 Capt. (temp. Major) C. E. van Rooyen, M.D. (125480).
 Capt. (Qmr.) (temp. Major) A. G. Williams (63667).
 Capt. (acting Major) R. S. Turner, M.B. (88289).
 Capt. K. MacK. Bell, M.B. (99327).
 Capt. E. L. Farrow (234204).
 Capt. R. Fletcher, M.B. (133223).
 Capt. S. G. McK. Francis, M.B. (98443).
 Capt. S. R. T. Headley, M.B. (216861).
 Capt. T. M. Lennox, M.B. (114982).
 Capt. A. D. Morgan, M.B. (88249).
 Capt. P. A. Petrides (205704).
 Capt. B. W. Powell, M.B. (122042).
 Capt. J. W. T. Pretsell, M.C., M.B. (230081).
 Capt. K. Simon (102681).
 Capt. J. W. Spence, M.B. (102683).
 Capt. W. W. Wilson (114770).
 Capt. G. Wilson (110074).
 Lt. (Qmr.) L. S. Brooks (246398).
 Lt. (Qmr.) G. H. Dugmore (246401).
 2647596 W.O. I. (Sjt.-Maj.) L. Langford.
 7257813 W.O. I. (Sjt.-Maj.) E. A. Smith.
 7261557 W.O. II. (Qmr.-Sjt.) (acting W.O. I. (S.M.)) D. J. Anderson.
 7260019 W.O. II. (Qmr.-Sjt.) G. B. Hill.
 6003888 W.O. II. (Qmr.-Sjt.) J. S. Sims.
 7356654 S/Sjt. A. W. Lindow.
 7370290 S/Sjt. W. F. Paterson.
 7354710 Sjt. (acting S/Sjt.) G. E. Benton.
 7348148 Sjt. (acting S/Sjt.) W. B. Dryden.
 7262461 Sjt. (acting S/Sjt.) C. C. Mackay.
 7261388 Sjt. (acting S/Sjt.) D. Moylan.
 734517 Sjt. L. E. Aspden.
 7523173 Sjt. A. W. Bond.
 7262327 Sjt. W. Cheetham.
 7266229 Sjt. J. Lyons.
 542745 Sjt. J. C. Mason.
 7263342 Sjt. A. J. Norman.
 7263391 Sjt. S. L. Quinnell.
 7346909 Sjt. H. C. Reynolds.
 7349607 Sjt. J. Shuttlebotham.
 7263039 Sjt. D. J. S. Smith.
 7263960 Cpl. (acting Sjt.) G. E. Henry.
 7372395 Cpl. (acting Sjt.) C. W. Williams.
 7368109 Cpl. J. Elcock.
 7368507 Cpl. A. V. George.
 7263135 Cpl. R. Hall.
 7395828 Cpl. A. W. Head.
 7521619 L/Cpl. R. Jackson.
 7372297 L/Cpl. G. H. Walker.
 7349561 L/Cpl. J. W. Wild.
 7260224 Pte. T. Betts.
 732337 Pte. E. J. Bonney.
 1822068 Pte. J. H. Foulds.
 7367524 Pte. C. H. Harris.

7379824 Pte. F. C. Hendon.
 7519740 Pte. W. G. How.
 7517701 Pte. R. Hunt.
 7367918 Pte. R. Hyams.
 7356994 Pte. F. C. Johnstone.
 7365585 Pte. R. A. J. Pennington.
 7518474 Pte. C. Reed.
 7366848 Pte. R. G. Wilkie.

The Army Dental Corps.

Capt. W. F. Cooper (127548).
 7538234 W.O. II (Qmr.-Sjt.) J. B. Wait.

Queen Alexandra's Imperial Military Nursing Service.

Miss P. M. D. Sowter, R.R.C. Chief Principal Matron (206462).

Miss I. B. Hazlett, R.R.C. Sister (acting Matron) (206207).

Miss H. Bates, Sister (213109).

Miss M. McLaren, Sister (208810).

April 6.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Malta :—

Col. W. K. Morrison, D.S.O., M.B. (8216), late R.A.M.C.

Major (temp. Lt.-Col.) T. F. Briggs (56022).

Capt. J. G. Pyper, M.D. (101005).

750985 W.O. II. (Qmr.-Sjt.) H. Woodhouse.

March 17.—Lt.-Col. J. H. G. Hunter, M.B. (14364), from R.A.M.C. to be Col. Feb. 21, 1944, with seniority from Nov. 9, 1940. (Substituted for the notifi. in *Gazette* (Supplement) dated Feb. 22, 1944.

The undermentioned Cols. late R.A.M.C., on completion of four years in the rank, are retained on the Active List supern. to estab. Feb. 21, 1944 :
 E. C. Lang, D.S.O. (4875). C. Crawford-Jones, C.B.E., M.B. (4865).

Lt.-Col. A. L. Robertson, O.B.E., M.B. (8755), retires on ret. pay on account of ill-health, Mar. 18, 1944, and is granted the hon. rank of Col.

March 21.—War Subs. Lt.-Col. (temp. Col.) (acting Maj.-Gen.) C. M. Page, C.B., D.S.O., M.B., F.R.C.S. (51065) (Emergency Comm.), relinquishes the acting rank of Maj.-Gen., Mar. 4, 1944.

March 24.—Major W. Davis, M.B. (9936), R.A.M.C., is restored to the rank of Lt.-Col. on ceasing to be empld. Mar. 25, 1944.

Capt. J. K. Chappell, M.B. (52440) h.p. list (late R.A.M.C.) retires on account of ill-health, receiving a gratuity, Mar. 25, 1944.

March 28.—Capt. (Qmr.) (temp. Major) F. G. Summers (56542) to be Major (Qmr.) Mar. 26, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.), John Frederick Ford (127760) (Emergency Comm.) to be Lt. (Qmr.), Mar. 26, 1944.

April 4.—War Subs. Lt.-Col. C. Donald, M.B., M.S., F.R.C.S. (125027), R.A.M.C., is granted the local rank of Brig., Feb. 7, 1944.

TERRITORIAL ARMY.

March 14.—War Subs. Major (temp. Lt.-Col.) (88685) (R.A.M.C.), to be a Consultant and is (acting Col.) E. Bulmer, O.B.E., M.D., F.R.C.P. granted the local rank of Brig., Jan. 29, 1944.

MISSING.

T. Major R. A. Murphy, Burma.
 Capt. R. Brown, Burma.
 Capt. L. J. H. Burton, Italy.

Capt. M. W. Harvey, Italy.
 Capt. G. S. Hodge, Italy.
 Lt. N. Cowley, Italy.

DEATHS ON ACTIVE SERVICE.

- DOCHERTY, Capt. J. J. Killed in action, Italy.
 GRAHAM, Col. L. A. J. Died in Middle East.
 JONES, Capt. N. W. Killed in action, Burma.
 ROBINSON, Capt. J. T. Killed in action, Burma.
 NEWLAND, 2/Lt. N. M. J. B. Died of wounds, Italy.
- STUPPELL, Major R. Killed in action, Western Desert.
 RODDY, Lt.-Col. F. A. Died at Sea.
 GRACE, Capt. E. M. Died in Italy.
 FOUCAR, Major R. A. Presumed killed in action at Sea.
 HILL, Lt.-Col. Sir N. G., Bt. Killed in Sicily.

DEATHS.

RODDY.—At sea on March 15, 1944, Lieutenant-Colonel Francis Augustus Roddy, M.B., R.A.M.C. Born Sept. 21, 1891, he took the M.B., Dublin, in 1914 and the D.P.H., Belfast, in 1925. Commissioned Lieutenant R.A.M.C., Special Reserve, October 15, 1914, he was promoted Captain April 18, 1915, and received a regular Commission as Captain April 1, 1919. He retired with the rank of Lieutenant-Colonel, receiving a gratuity, Dec. 24, 1924. He rejoined Sept. 2, 1939. He served in France and Belgium, July 3, 1915, till July 12, 1916, receiving the 1914-15 Star, British War and Victory Medals. He took part in the third Afghan War in 1919, being awarded the Medal with Clasp, and in Waziristan in 1919-1921 receiving a clasp to the medal.

KENNEDY.—In Ash, Surrey, on April 4, 1944, Colonel James Crawford Kennedy, C.B.E., late R.A.M.C., Retired. Born Feb. 1, 1879, he was the son of the late Rev. W. D. Kennedy, of Perth. Educated at Perth Academy and Edinburgh University, he took the M.B., Edinburgh, in 1900, and the M.D. with Gold Medal in 1908. In 1909, he took the D.T.M. and H., Cambridge, and the M.R.C.P., Edinburgh, in 1925. Commissioned Lieutenant R.A.M.C. Nov. 29, 1900, he was promoted Captain November 29, 1903, Major May 29, 1912, and Lieutenant-Colonel March 18, 1918. He was appointed Honorary Physician to the King and received the Brevet of Colonel Sept. 27, 1923. Promoted substantive Colonel May 30, 1928, he retired May 30, 1932. He served on the Mediterranean Fever Commission 1904-1906 and was highly commended by the Royal Society. At a later period, he discovered the first clue to the relationship between Mediterranean Fever and Con-

tagious Abortion in England, and in 1926 was invited to be one of the openers at a Discussion on this subject at the Royal Society of Medicine. He was Assistant Professor of Pathology, Royal Army Medical College 1909 to 1913 and Professor of Tropical Medicine, 1920 to 1922. He was Consulting Physician to the British Army, 1922 to 1929. Created C.B.E. in the birthday honours of 1924. After retiring he was Medical Inspector of the Peninsular and Oriental and Allied Steamship Companies. He contributed articles to medical literature on Tropical Medicine and Bacteriology. He was a very fine low handicap golfer. On one occasion he was the runner-up for the R.A.M.C. Championship. During the European War he served in India and Mesopotamia, being mentioned in despatches and awarded the British War and Victory Medals.

YOUNG.—On April 7, 1944, Colonel Charles Augustus Young, C.B., C.M.G., late R.A.M.C., Retired. Son of the late Colonel William Young, 49th and 14th Regiments, he was born in Portarlinton, Nov. 15, 1863. Having taken the L.R.C.S.I. in 1885 and the L.R.C.P.I. in 1886, he entered the Army as Surgeon on Feb. 5, 1887. Promoted Major R.A.M.C. Feb. 5, 1899, Lieutenant-Colonel Nov. 2, 1911, and Colonel March 1, 1915, he retired Sept. 15, 1919. He served as Staff Officer to the A.M.O. (afterwards D.A.D.M.S.) Welsh Division T.F. from April 1, 1911, to March 30, 1914. He served with the Irrawaddy Column in the Burmese Expedition of 1892, being awarded the Medal with Clasp. He served in France from Aug. 26, 1914, till March 19, 1919. Four times mentioned in despatches, he was created C.B. and C.M.G. and awarded the 1914 Star, British War and Victory Medals.

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JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

MAY, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

April 27, 1944.—The KING has been graciously pleased to approve the following awards to the undermentioned repatriated prisoners of war in recognition of gallant and distinguished services prior to their captivity :—

The Military Medal.

7348830 S/Sjt. Edgar Norris Whitehead, Royal Army Medical Corps.

7348882 Pte. Alfred Chittock, Royal Army Medical Corps.

April 27.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the field :—

Capt. G. H. A. Simmons (106128), Royal Army Medical Corps.

May 4.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Military Cross.

Capt. Goronwy Owen Hughes, M.B. (133543), Royal Army Medical Corps (Rhyll).

Capt. Ewart Henly Jones, M.B. (234754), Royal Army Medical Corps (Sheffield, 6).

The Distinguished Conduct Medal.

7264530 Sjt. Alexander Laird Walker, Royal Army Medical Corps (Dartford).

The Military Medal.

7262210 Cpl. William Curthell, Royal Army Medical Corps (Leeds).

7387062 Pte. Arthur Oliver Emery, Royal Army Medical Corps (Southampton).

7366338 Pte. Walter James Westlake, Royal Army Medical Corps (London, N.W.10).

April 20.—The KING has been graciously pleased to confer the Efficiency Decoration upon the following officers of the Territorial Army :—

Royal Army Medical Corps.

Col. J. Carver (34610).

Lt.-Col. (temp. Col.) J. T. McQuat, O.B.E., M.B., F.R.C.S. (36018).

Lt.-Col. F. A. Belam, M.B. (67392).

Lt.-Col. T. S. A. Samuel, M.C. (33044).

Major (temp. Lt.-Col.) J. H. Dunn, M.D., M.R.C.P. (40015).

Major (temp. Lt.-Col.) J. B. S. Guy (40285).

Major (temp. Lt.-Col.) W. A. Mackey, M.B., F.R.F.P.S., F.R.C.S. (39758).

Major (temp. Lt.-Col.) D. J. MacMyn, M.B. (22823).

Major (temp. Lt.-Col.) J. K. Steel (40138).

Major (temp. Lt.-Col.) G. Sparrow, M.C., M.B., F.R.C.S. (41670).

Major (temp. Lt.-Col.) G. D. Thompson, M.B. (40601).

The Army Dental Corps.

Major F. A. Walter (38641) (T.A.R.O.).

April 14.—Col. J. C. Sproule, C.B.E., late R.A.M.C. (4880), on completion of four years in the rank is retained on the Active List supern. to establ., Apr. 15, 1944.

Lt.-Col. O. C. Link, M.B. (22296), from R.A.M.C., to be Col. Apr. 15, 1944, with seniority from Apr. 8, 1941.

Major H. A. Hill (15611) to be Lt.-Col., Apr. 15, 1944.

April 18.—Col. W. Benson, C.B.E., D.S.O., late R.A.M.C. (15694), ret. pay, reverts to ret. pay on account of ill-health, Apr. 18, 1944.

Capt. (War Subs. Major) J. J. O'Connell (64940), M.B., to be Major, Apr. 1, 1944.

Capt. (War Subs. Major) K. H. Clark (63256), M.B., to be Major, Apr. 18, 1944.

Lt. L. S. P. Divers (69314) (Short Service Comm.) to be Capt., Apr. 17, 1944.

Capt. J. J. Justice (78770) (Short Service Comm.) retires on account of ill-health, Apr. 18, 1944.

Lt.-Col. D. Fettes, O.B.E., M.B., F.R.C.S. Edin. (13746), R.A.M.C., to be a Consultant and is granted the local rank of Brig., Feb. 13, 1944.

April 25.—Lt.-Col. K. P. Mackenzie, M.B. (14221), having attained the age for retirement, is retained on the Active List supern. to establ., Apr. 24, 1944.

War Subs. Capt. (now War Subs. Lt.-Col.) E. A. Bennet, M.D. (133552), R.A.M.C., to be a Consultant and is granted the local rank of Brig., Oct. 21, 1942.

April 28.—Capt. (War Subs. Major) W. M. Oxley (63803) to be Major, Apr. 25, 1944.

Capt. W. B. Hamilton, M.D. (65317), to be Major, Apr. 25, 1944.

War Subs. Lt.-Col. G. MacDonald, M.D. (111634), R.A.M.C., to be a Consultant and is granted the local rank of Brig., Apr. 1, 1943.

May 2.—The undermentioned officers holding Short Service comms. are appointed to permanent comms., May 1, 1944, retaining their present seniority :—

Capt. (War Subs. Major) P. R. Wheatley, D.S.O., M.B. (52033).

Capt. A. L. J. Webb (78705).

Capt. J. S. F. Watson (78900).

Capt. J. B. M. Milne, M.B. (78906).

Capt. R. L. MacPherson, M.B. (89932).

War Subs. Lt.-Col. C. Donald, O.B.E., M.B., M.S., F.R.C.S. (125027), R.A.M.C., is granted the local rank of Brig., Mar. 7, 1944. (Substituted for the notin. in *Gazette* (Supplement) dated Apr. 4, 1944.)

May 5.—War Subs. Lt.-Col. (temp. Col.) (acting Maj.-Gen.) A. W. Stott, F.R.C.P. (106008), to be temp. Maj.-Gen. and War Subs. Col., May 5, 1944.

War Subs. Lt.-Col. (temp. Col. (acting Maj.-Gen.)) W. H. Ogilvie, M.D., F.R.C.S. (131569), to be temp. Maj.-Gen. and War Subs. Col., May 5, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.)) J. T. Conway (75478), to be Capt. (Qmr.), May 4, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.)) A. Steer, M.M. (75479), to be Capt. (Qmr.), May 4, 1944.

May 9.—Lt.-Col. W. Campbell, M.B. (5081), from R.A.M.C., to be Col., May 11, 1944, with seniority from Mar. 20, 1944.

Capt. B. Levy, M.B. (85407) (Short Service commn.) is apptd. to a permanent commn., Feb. 1, 1944, and to retain his present seniority.

May 12.—Col. G. F. Allison, M.C. (4856), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to establ., May 11, 1944.

Major (War Subs. Lt.-Col.) C. V. Macnamara, M.B. (15659), to be Lt.-Col., May 11, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.)) W. E. Conway, M.M. (75653), to be Capt. (Qmr.), May 12, 1944.

Col. G. A. D. Harvey, C.B., C.M.G., late R.A.M.C. (ret. pay), reverts to ret. pay on account of ill-health, May 12, 1944, and is restored to rank of Maj.-Gen.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

MANY letters of thanks have been received from prisoners of war and their relatives in acknowledgment of parcels sent by the Comforts Guild and we regret that lack of space precludes extracts from being published.

From January 18, 1944.

	£	s.	d.
Camp Reception Station, Ayr	10	0	0
146 Field Ambulance	15	0	0
160 Field Ambulance	24	16	10
Command Med. Store, Tidworth ..	6	11	6
H.Q. Scottish Command	20	0	0
16 Field Dressing Station	1	12	0
75 General Hospital	30	0	0
23 Camp Reception Station	7	8	2
Command Medical Store	2	2	0
C.R.S., Isle of Wight	6	0	0
Staff, "E." Block, Royal Victoria Hospital, Netley	4	5	11
24 (London) General Hospital ..	12	13	6
Staff, H.Q. (Medical) 1 Corps Static..	6	2	6
C.R.S., Aberfoyle	50	0	0
Units in S. Highland District ..	30	0	0
6 A.A. Coy., R.A.M.C.	15	12	0
105 General Hospital	6	0	0
Units in B.N.A.F.	77	6	6
Staff, War Office, p.p. Major Bull ..	5	0	0

February.

6 A.A. Group (Medical)	1	0	0
Isolation Hospital, Allt-y-Ferri ..	10	10	0
No. 3 Training Battalion	20	11	6
A.D.M.S. and Staff, W. Lancs. Dist..	3	4	6
Military Hospital, Ormskirk	52	0	0
Mil. Wing, Ballochingle, E.M.S. Hosp.	10	0	0
22 Coy., R.A.M.C.	10	0	0
110 General Hospital	5	12	4
16 C.C.S.	10	10	0
Sjts. Mess, Army School of Hygiene ..	3	0	0
Units in N. Command, p.p. Mrs. Mitchiner	55	12	9
Staff, Isolation Hospital, Aldershot ..	5	0	0
R.A.M.C. Officers, H.Q., India	6	10	6
16 Field Dressing Station	2	6	0
C.R.S., Frant	1	0	0
86 General Hospital	5	0	0
C.R.S., Shandon	6	6	0
25 Field Dressing Station	12	0	0
Staff, A.D.M.S. Office, E. and S. District	5	10	0
6 A.A. Group (Medical)	10	0	0
Sjts. Mess, 105 General Hospital ..	5	0	0
Units in N. Highland District ..	137	3	10
19 Coy. R.A.M.C.	20	5	9
A.D.M.S. and Staff, Lancs. and Border District	3	10	6

March.

All Ranks, 66 Home Ambulance Train	1	1	0
Mil. Hospital (Psychiatric), Northfield	75	0	0
H.Q. Staff, Medical Officers and Staff, C.R.S., 4 A.A. Group	42	10	0
75 General Hospital	25	18	11
N.C.O.s and Men, 13 Coy. R.A.M.C. ..	15	0	0
Personnel, 110 General Hospital ..	3	17	3
P.R.I., 105 General Hospital	3	0	0
R.A.M.C. O.R. Staff, H.Q. E. Command	3	12	0
Sjts. Mess, Military Hospital, Lincoln..	5	0	0
Staff, H.Q. N. Highland District ..	12	0	0
R.A.M.C. Units in B.N.A.F.	144	1	0
P.R.I., 3 Coy., R.A.M.C.	20	0	0
C.R.S. (A.A.), 4 Group, Anglesey ..	13	10	0
9 Coy., R.A.M.C.	57	7	5
P.R.I., 3 Coy., R.A.M.C.	4	16	0
Sjts. Mess, 3 Coy., R.A.M.C.	5	0	0
Bellsdyke Military Hospital	17	0	0
Military Hospital, Stirling	4	18	0
Mil. Hospital, "D" Wing, Gartlock ..	25	0	0
C.R.S. (A.A.), No. 1 Group	4	6	10
Staff, Military Hospital, Fort George..	10	0	0
13 Coy., R.A.M.C.	10	0	0
Military Hospital, Sheerness	31	7	4
H.Q., S. Highland District	20	0	0
Military Hospital, Ouch	22	4	3
H.Q., N. Highland District	15	5	7
45 Field Hygiene Section	12	12	0
Officers and Staff, C.R.S., Cardiff ..	8	4	0
"Ward 8," "D Wing," Gartlock Hosp.	5	5	0
Units in N. Command, p.p. Mrs. Mitchiner	73	6	3
Nursing Staff, Military Hosp., Lincoln	2	2	0
R.A.M.C. Officers, G.H.Q., India ..	7	4	6
Staff, War Office, p.p. Major Bull ..	8	12	6

April.

Military Hospital, Malmesbury ..	43	7	5
Personnel, 110 General Hospital ..	3	9	4
Personnel, Medical Store, Tidworth ..	5	12	0
L.A.A. and H.A.A. Camp and M.I. Room Staff, Clacton	29	6	4
R.A.M.C. Units in B.N.A.F.	92	12	0
H.Q., R.A.M.C. (A.A.), 4 Group ..	2	0	0
Dressing Station, Dover	3	0	0
Staff, War Office, A.M.D.2/Stats., p.p. Lt. Smith	15	10	0
A.D.M.S., 76 Division	11	16	9
Personnel, 2 A.A. Group (R.A.M.C.) ..	3	10	0
111 General Hospital, Copthorne ..	30	0	0
Military Hospital, Chepstow	5	8	7
56 Ambulance Train	3	0	0
Units in S. Highland District ..	21	11	0
Units in N. Command, p.p. Mrs. Mitchiner	82	12	0

	£	s.	d.		£	s.	d.
Officers and Men, Messing Officers and V.A.D.s, Orkney and Shetland Defences	200	0	0	187 Field Ambulance	10	0	0
109 General Hospital	17	4	4	16 Field Dressing Station	3	0	0
A.D.M.S., Norfolk and Cambridge Dist.	12	13	4	Units in B.N.A.F.	67	10	0
Staff, H.Q. (Medical) 80 Division	15	0	0	Officers and O.R.s, R.A.M.C., H.Q., E. Command	50	0	0
55 Field Hygiene Section	2	15	0	O.C. and Staff, C.R.S., Clacton	30	0	0
Staff, H.Q. (Medical), S.E. Command	3	12	9	9 Coy., R.A.M.C.	22	0	0
Units in N. Highland District	38	10	0	Units in B.N.A.F.	30	3	3
Maidstone Group E.M.S. Hospitals	5	5	0	Sjts. Mess, 17 Field Dressing Station	5	0	0
Royal Victoria Hospital	10	0	0	38 Field Hygiene Section	2	0	0
17 Coy., R.A.M.C.	19	17	11	130 Field Ambulance	10	0	0
Drafts, p.p. General Tomlinson	20	0	0	110 General Hospital	3	16	7
Lt.-Col. J. D. Cruickshank	50	0	0	12 General Hospital (Church Collection)	1	0	0
May.				R.A.M.C. Headquarters Mess, Millbank, London, S.W.1.			
Personnel, Medical Store, Walton	50	0	0				

PRISONERS OF WAR AND MISSING.

Prisoners of War.

Capt. N. Cowley, Italy.
 Capt. M. W. Harvey, Italy.
 Capt. G. S. Hodge, Italy.
 Capt. R. Ramsay, Burma.

Missing.

Capt. H. E. Thackeray, at Sea.
 Major E. B. Rotherham, at Sea.

AMENDMENT.

Corps News for January, 1944. Page 3, under "Missing," for "Lieut. D. M. Baker," read "Lieut. D. M. Beker."

DEATHS ON ACTIVE SERVICE.

ROBINSON, Capt. J. T. Killed in action, Burma.
 JONES, Capt. N. W. Killed in action, Burma.
 GRAHAM, Col. L. A. J. Died, Middle East.
 DOHERTY, Capt. J. J. Killed in action, Italy.
 WALKER, Capt. E. A. Died, U.K.
 EDWARDS, Major R. Killed in action.

GREENWOOD PENNY, Capt. C. Killed in action, Burma.
 GANNON, Capt. C. J. Died of wounds, Burma.
 GIBBON, Capt. E. Killed in action, Italy.
 WARD, Major T. P. Killed in action.

DEATHS.

GRAHAM, Colonel Lionel Augustine Joseph.—Died of cerebral thrombosis on March 24 whilst on active service with the M.E.F., qualified L.M.S.S.A. London in 1915 after studying at Cambridge and Guy's Hospital.

To his colleagues in the R.A.M.C. "Nap" was well known as an experienced physician and administrator who had specialized in Venereology and Dermatology. He had served in England (Tidworth), Egypt, Palestine, Syria, India and Malaya, and in the present war he served with the B.E.F. at Army Headquarters in France. On his return from France he went out to the M.E.F., where he was in command of a General Hospital. He served with the Egyptian Expeditionary Force in the last war, being awarded the British War and Victory Medals. He was with the E.E.F. from June 1, 1916, to the end of the war.

When at Cambridge he won his half-blue at lawn tennis and kept up his keen interest in the game throughout his career. He regularly represented the R.A.M.C. at this game and at Singapore in 1935 he won the open singles in the Services Tournament against a Wimbledon player of exactly half his own age. In the Singapore lawn tennis All-Services inter-unit competition he had no partner strong enough to enable the R.A.M.C. to beat the R.A. and so win the cup. On one occasion the R.A.M.C. team were leading the Gunners 4-0 in the final set but finally lost. He had a marvellous eye for any ball game and could, for instance, place his services with uncanny accuracy, first in one corner and then the other of the service court. He was also very successful at golf and won several competitions at Singapore

and in India. He was also a very keen stamp collector, and had a detailed knowledge of the subject.

The Army Medical Services have lost a most popular and efficient officer and doctor and the Army a very good all-round sportsman. His brother officers and colleagues will cherish the memory of "Nap" as one of their best friends and their deepest sympathy goes out to his widow and his three children, the eldest of whom is now a Lieutenant in the Royal Artillery (Airborne).

D. G. E.

ALLPORT.—In Woking on March 16, 1944, Lieutenant-Colonel Henry Kingston Allport, M.D., R.A.M.C., Retired. Born Nov. 29, 1857, he took the M.D., M.Ch., of the Royal University, Ireland, in 1879, and was commissioned Surgeon Feb. 5, 1881. Promoted Surgeon-Major and Lieutenant-Colonel R.A.M.C. Feb. 5, 1901, he retired April 22, 1908.

BENSON.—On May 7, 1944, Lieutenant-Colonel Charles Thornton Vere Benson, R.A.M.C., Retired. Born Sept. 18, 1882, he was educated at Cambridge and St. Thomas's Hospital, and took the M.R.C.S. England, and the L.R.C.P. London, in 1908. Commissioned Lieutenant R.A.M.C. Jan. 30, 1909, he was promoted Captain July 30, 1912, Major Jan. 30, 1921, and Lieutenant-Colonel Dec. 8, 1933. He retired Sept. 13, 1937, and took up the Retired Pay appointment at Worcester Jan. 24, 1938, which he was holding at the time of his death. He served against the Mohmands and Swatis in 1915 and with the Aden Field Force from 1915 till 1918, being awarded the 1914-15 Star, the British War and Victory Medals.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

JUNE, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

May 18, 1944.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma :—

The Distinguished Service Order.

Capt. (temp. Major) Bernard George Albert Lilwall, M.B., F.R.C.S. (223540) Royal Army Medical Corps (Ramsgate).

June 8.—The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to give orders for the following promotions in, and appointments to, the Most Honourable Order of the Bath :—

To be Additional Members of the Military Division of the Third Class, or Companions, of the said Most Honourable Orders :—

Maj.-Gen. (local Lt.-Gen.) Gordon Wilson, C.B.E., M.C., M.B., K.H.S. (26291) late Royal Army Medical Corps.

Maj.-Gen. Gilbert Alan Blake, M.B., K.H.S. (4799) late Royal Army Medical Corps.

Col. (temp. Maj.-Gen.) Philip Henry Mitchiner, C.B.E., T.D., M.D., M.S., F.R.C.S., K.H.S. (2162) late Royal Army Medical Corps (Territorial Army).

June 8.—The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire :—

To be Additional Commanders of the Military Division of the said Most Excellent Order :—

Col. Edward Bruce Allnutt, M.C. (10751) late Royal Army Medical Corps.

Lt.-Col. (temp. Col.) (local Brig.) Grant Massie, M.S., F.R.C.S. (128972) Royal Army Medical Corps.

Col. (local Brig.) John Murray Weddell, F.R.C.S. (18884) late Royal Army Medical Corps.

The KING has been graciously pleased, on the occasion of His Majesty's Birthday and on the advice of His Majesty's New Zealand Ministers, to give orders for the following appointments to the Most Excellent Order of the British Empire :—

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Lt.-Col. Harold John Bensted, M.C. (15778) Royal Army Medical Corps.

Lt.-Col. (Qmr.) George Abel Collier (9654) Royal Army Medical Corps.

Major (temp. Lt.-Col.) William Dale (112637) Royal Army Medical Corps.

Major (temp. Lt.-Col.) Christopher Robson Dudgeon, M.C. (15374) Royal Army Medical Corps.

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. (temp. Major) John Amos, M.B. (102123) Royal Army Medical Corps.

Major Samuel John Chesser (101280) Royal Army Medical Corps.

Capt. (temp. Major) Michael Whittaker Carlton Oldfield, M.B., F.R.C.S. (44832) Royal Army Medical Corps (Territorial Army).

Capt. (temp. Major) Miss Elaine Margaret Catherine Salmond, M.D., F.R.C.S. (147752) Royal Army Medical Corps.

Major Sydney George Watson (45096) The Army Dental Corps.

June 8.—The KING has been graciously pleased, on the occasion of the Celebration of His Majesty's Birthday, to approve the award of the British Empire Medal (Military Division) to the under-mentioned :—

No. 2651901 Sjt. William Alston, Royal Army Medical Corps.

No. 7261330 Cpl. (acting Sjt.) Thomas Charles Benton, Royal Army Medical Corps.

No. 7523457 Cpl. Charles George Dowse, Royal Army Medical Corps.

No. 6984407 Pte. (acting Cpl.) John Fulton, Royal Army Medical Corps.

No. 7345985 S/Sjt. (acting Warrant Officer Class II) Albert Robert Douglas Jones, Royal Army Medical Corps.

No. 7262415 Sjt. Edward Norris, Royal Army Medical Corps.

No. 7536071 S/Sjt. Edwin Seddon Reeve, The Army Dental Corps.

No. 7379337 Pte. Elisha Thomas Taylor, Royal Army Medical Corps.

No. 7266739 S/Sjt. (now Warrant Officer Class II) John Thomas Whittemore, Royal Army Medical Corps.

June 8.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Royal Red Cross :—

Bar to the Royal Red Cross, First Class.

Dame Katharine Henrietta Jones, D.B.E., R.R.C. (20637), Queen Alexandra's Imperial Military Nursing Service.

To be Members of the Royal Red Cross, First Class :—

Miss Nancy Patricia de Beauvois Bampton, Sister (acting Matron) (206030), Queen Alexandra's Imperial Military Nursing Service.

Miss Olive Emily Clark, Sister (acting Matron) (206063), Queen Alexandra's Imperial Military Nursing Service.

Miss Doris Dulake, Sister (acting Matron) (206111), Queen Alexandra's Imperial Military Nursing Service.

Miss Isabella Bingham Hazlett, Sister (acting Matron) (206207), Queen Alexandra's Imperial Military Nursing Service.

Miss Mabel Hauffler Joyce, Matron (218264), Queen Alexandra's Imperial Military Nursing Service.

Miss Margaret Phoebe Northrop, Sister (acting Matron) (206350), Queen Alexandra's Imperial Military Nursing Service.

Miss Florence Mary Percival, Sister (acting Matron) (206380), Queen Alexandra's Imperial Military Nursing Service.

Miss Elizabeth Sanger, Matron (206436), Queen Alexandra's Imperial Military Nursing Service.

Miss Christina Fowler Fraser, Sister (acting Matron) (206144), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Janet Balderston Campbell Orchardson, Matron (221510), Territorial Army Nursing Service.

Miss Ann Forsyth Thom, Matron (215005), Territorial Army Nursing Service.

To be Associates of the Royal Red Cross, Second Class.

Miss Margaret Ashmore, Nursing Officer (206551), Queen Alexandra's Imperial Military Nursing Service.

Miss Marjorie Clark, Nursing Officer (206092), Queen Alexandra's Imperial Military Nursing Service.

Miss Doris Elethea Sybil Conely, Sister (206830), Queen Alexandra's Imperial Military Nursing Service.

Miss Gwendolen Nancy Evans, Sister (206141), Queen Alexandra's Imperial Military Nursing Service.

Miss Margaret Winter Milne Glass, Sister (temp. Matron) (239764), Queen Alexandra's Imperial Military Nursing Service.

Miss Coralie Josephine Jeboult Jones, Sister (Asst. Matron) (206244), Queen Alexandra's Imperial Military Nursing Service.

Miss Gladys Murray, Sister (Asst. Matron) (206320), Queen Alexandra's Imperial Military Nursing Service.

Miss Henrietta Hope Tuissant, Sister (274159), Queen Alexandra's Imperial Military Nursing Service.

Miss Helen Margaret Buchanan, Sister (241796), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Gertrude Carruthers, Sister-in-Charge (206069), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Margaret Elizabeth Low Soutar Clark, Sister (206873), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Ellen Annie Davies, Sister (acting Matron) (231365), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Olive Mary Liddell Davies, Sister (206992), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Brenda Hazelby Edwards, Sister (238151),

Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Sheila Saisie Raeburn, Sister (209158), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Winifred Waite, Sister (Asst. Matron) (209474), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Jessie Wilson, Sister (209456), Queen Alexandra's Imperial Military Nursing Service Reserve.

Miss Euphemia Maclean, Nursing Officer (213909), Territorial Army Nursing Service.

Miss Edith Mary Rawlins, Sister (215302), Territorial Army Nursing Service.

Miss Alice Alexandra Smith, Sister (215476), Territorial Army Nursing Service.

Miss Jean Thomson, Sister (236240), Territorial Army Nursing Service.

May 19.—The undermentioned to be Col.: Lt.-Col. J. J. Magner, *M.C.*, *M.B.* (8718), from *R.A.M.C.* May 23, 1944, with seniority from Jan. 1, 1941.

Col. (temp. Brig.) E. A. Sutton, *C.B.E.*, *M.C.* (8525), late *R.A.M.C.*, to be local Maj.-Gen. Apr. 29, 1944.

Major J. C. Coutts, *M.B.* (10438), to be Lt.-Col. May 23, 1944.

May 23.—Lt.-Col. W. Campbell, *M.B.* (5081), from *R.A.M.C.*, to be Col. May 11, 1944, with seniority Mar. 20, 1941. (Substituted for the notifn. in *Gazette* (Supplement) dated May 12, 1944.)

Col. A. Jackson (8074), late *R.A.M.C.*, having attained the age for retirement is retained on the Active List supern. to establish. May 23, 1944.

Capt. D. W. Bentinck (75590) retires on account of ill-health, May 23, 1944, and is granted the hon. rank of Major.

May 26.—Col. A. A. M. Davies (4860), late *R.A.M.C.*, on completion of four years in the rank, is retained on the Active List supern. to establish. May 26, 1944.

Lt.-Col. G. D'R. Carr, *M.C.* (4218, from *R.A.M.C.*, to be Col. May 26, 1944, with seniority May 2, 1941.

Major F. K. Escritt, *O.B.E.* (26278), to be Lt.-Col. May 26, 1944.

War Subs. Major E. R. Cullinan, *M.D.*, *F.R.C.P.* (173837) (*R.A.M.C.*) to be a Consultant and is granted the local rank of Brig. Jan. 21, 1944.

May 30.—Col. L. Dunbar, *O.B.E.*, *M.B.* (4861), late *R.A.M.C.*, on completion of four years in the rank, is retained on the Active List supern. to establish. May 30, 1944.

Lt.-Col. J. S. K. Boyd, *O.B.E.*, *M.B.* (15763), from *R.A.M.C.*, to be Col. May 30, 1944, with seniority from July 1, 1941.

June 2.—Col. (temp. Brig.) J. C. A. Dowse, *C.B.E.*, *M.C.*, *M.B.* (8626), late *R.A.M.C.*, to be a *D.M.S.*, and is granted the acting rank of Maj.-Gen. May 8, 1944.

Lt.-Col. D. S. Martin, *M.B.* (8716), having attained the age limit for retirement, is retained on the Active List, supern. to establish. June 1, 1944.

June 6.—Lt.-Col. J. McFadden, *M.B.* (5304), having attained the age limit for retirement, is retained on the Active List, supern. to establish. June 6, 1944.

The undermentioned Capt. (War Subs. Majors) to be Majors :—

June 1, 1944. A. MacLennan, *M.B.* (63253).

June 7, 1944. J. H. J. Crosse, *O.B.E.* (63166).

The undermentioned Capt. to be Majors :—

June 6, 1944. G. S. Musgrove, *M.D.* (65603).

June 7, 1944. F. E. Buckland, *M.B.* (63163), J. Boyle (63161), R. S. Vine, (63225), J. E. Jameson (63228).

Short Service Commission. Lt. K. Greenwood, *M.B.* (279754), to be Capt. June 5, 1944.

June 9.—Col. (temp. Brig.) (local Maj.-Gen.) E. A. Sutton, *C.B.E.*, *M.C.* (8525), late *R.A.M.C.*, to be a *D.M.S.*, and is granted the acting rank of Maj.-Gen. May 7, 1944.

Major C. A. Whitfield, *M.D.* (15672), to be Lt.-Col. June 1, 1944.

Regular Army Reserve of Officers.

May 19.—General List.

Col. J. Heatley Spencer, *C.B.E.*, *M.D.*, *F.R.C.P.* (4295), late *R.A.M.C.*, having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. May 1, 1944.

June 13.—Maj.-Gen. G. A. D. Harvey, *C.B.*, *C.M.G.*, (10625), late *R.A.M.C.*, ceases to belong to the Res. of Offrs., on account of ill-health May 12, 1944.

TERRITORIAL ARMY.

May 23.—Col. (temp. Maj.-Gen.) Sir E. M. Cowell, *K.B.E.*, *C.B.*, *D.S.O.*, *T.D.*, *M.D.*, *F.R.C.S.* (2804), late *R.A.M.C.*, relinquishes the appt. of Dir.

Med. Servs. retaining the temporary rank of Maj.-Gen. Mar. 19, 1944.

REPATRIATED PRISONERS OF WAR.

Col. D. P. Levack.
Lt.-Col. W. E. A. Buchanan.
Major F. J. O'Meara.
Major A. S. Till.
Capt. G. Cowper.

Capt. W. M. Davidson.
Capt. C. Donald.
Capt. W. Dornan.
Capt. A. G. Hewer.

DEATHS ON ACTIVE SERVICE.

HAMILTON, Capt. C. W. Died of wounds, Italy.
YARDLEY, Capt. B. E. Died of wounds, Italy.
JONES, Capt. R. G. H. Killed in action, Italy.

WATT, Lt. R. A. S. Presumed killed in action at sea.

DEATHS.

We have received the following appreciation of the late Sir Cuthbert Wallace, from Lieutenant-General Sir James Hartigan, *K.C.B.*, *C.M.G.*, *D.S.O.*, late Director-General, Army Medical Services :—

The death of Sir Cuthbert Wallace will be much regretted by the many *R.A.M.C.* officers who had the good fortune to be associated with him during the 1914-18 campaign.

As Consulting Surgeon to the First Army—a position he filled with much distinction—he was most deservedly popular with all his colleagues from the *D.M.S.* downwards, and by the young Surgeons of that Army he was regarded as guide, philosopher and friend.

Regular members of the Corps have special reason to be grateful to him for his great interest in our Service—an interest first acquired during the South African War and maintained undiminished to the end.

During most of the period I was Director-General Sir Cuthbert was President of the College of Surgeons, but in spite of the many duties which that appointment entailed he continued to be an active member of the Army Medical Advisory Board and of the Q.A.I.M.N.S. Committee.

When, as was frequently the case, I had occasion to seek his advice, a telephone message to his house was promptly followed by his presence at the War Office when he would give all the assistance and advice in his power.

He was interested in anything which affected the welfare and efficiency of the Corps to which he was genuinely attached, and often spoke of the many friends he made while serving in it. On the last occasion I met him he was regretting that age prevented him from returning to uniform in the present struggle.

He was very keen that the best type of medical man should enter the *R.A.M.C.* and used to be delighted when (as was often the case) his own hospital, St. Thomas's, provided its full share of suitable candidates.

By his death the Corps has lost a most distinguished officer and a very faithful friend.

CAHILL.—In Bedford on May 14, 1944, Lieutenant-Colonel Robert John Cahill, *D.S.O.*, *R.A.M.C.*, Retired. Born October 20, 1881, he took the *M.B.* of the Royal University of Ireland in 1903 and the *D.P.H.*, *R.C.S.I.*, in 1906. He was commissioned Lieutenant *R.A.M.C.* January 30, 1904. Promoted Captain July 30, 1907, and Major July 1, 1915, he retired with the rank of Lieutenant-Colonel January 30, 1924. He served on the North-West Frontier of India in 1908, being awarded the Medal with Clasp. He served in France from August 14, 1914, till taken Prisoner of War August 24, 1914. He served in Gallipoli from August 25, 1915, till January 1, 1916, and in Egypt and with the Egyptian Expeditionary

Force including Palestine, culminating in the Capture of Jerusalem, from January 2, 1916. Mentioned in despatches, he was awarded the *D.S.O.*, 1914 Star and Clasp, British War and Victory Medals. He held the Retired Pay Appointment at Leicester from February 5, 1924, till November 27, 1924.

CARR.—In Chilworth, Southampton, on May 23, 1944, Major-General Howard Carr, *C.B.*, *M.D.*, late *R.A.M.C.*, Retired. Son of the late Lieutenant-Colonel G. Carr, he was born March 8, 1863. Having taken the *M.D.* and *M.Ch.* of the old Royal University of Ireland in 1884, he entered the Army as Surgeon August 1, 1885. Promoted Surgeon Major August 1, 1897, Lieutenant-Colonel August 1, 1905, Colonel March 1, 1915, and Major-General December 26, 1917, he retired December 26, 1919. He served in the Burma campaign of 1885–1887 receiving the Medal with Clasp. He took part in the 2nd Miranzai Expedition of 1891. He again saw service with the Dongola Expedition of 1896 and the Nile Expedition of 1898 including the Battles of the Atbara and Khartoum. Mentioned in despatches, he was awarded the Medal and the Egyptian Medal with two Clasps. He was in South Africa 1900–1902. Thanked by the Commander in Chief, he received the Queen's Medal with Clasps, Cape Colony, Orange Free State and Transvaal and the King's Medal with two Clasps. He served in France from October 17, 1914, till 1919, as *A.D.M.S.* in 1915 and 1916, as *D.D.M.S.* in 1916 and 1917 and as *D.M.S.*, Lines of Communication, in 1918. Five times mentioned, he was created *C.B.*, Knight of Grace of the Order of St. John, Grand Officer of the Military Order of Avis and awarded the 1914 Star, British War and Victory Medals. He was a keen yachtsman and a prominent member of the Royal Southern Yacht Club. A cheery companion and good company.

BIRRELL.—On May 29, 1944, Colonel Edwin Thomas Fairweather Birrell, *C.B.*, *C.M.G.*, *M.B.*, late *R.A.M.C.*, Retired. Fifth son of the late James Birrell, *J.P.*, formerly of Penicuik, Midlothian, he was born there, February 28, 1874. He was educated at Trinity College,

Glenalmond, and Edinburgh University, where he took the *M.B.* in 1895. Commissioned Surgeon Lieutenant July 29, 1896, he was promoted Captain *R.A.M.C.* July 29, 1899, Major July 29, 1907, Lieutenant-Colonel March 1, 1915, Colonel December 26, 1917, and retired December 26, 1923. He took part in the Balkan Campaign of 1912–13 as Chief British Red Cross Commissioner with the Bulgarian Forces. He served in France 1914–15 as *D.A.D.M.S.* and *A.D.M.S.* and in Macedonia from 1915 till 1918 as *D.D.M.S.* He was *D.M.S.* British Military Mission South Russia in 1919. Seven times mentioned he was created *C.B.*, *C.M.G.*, and awarded 4th Class Order of the Redeemer (Greek), 3rd Class Greek Medal for Military Merit, 1914 Star and Clasp, British War and Victory Medals.

CATON-JONES.—In Pontesford, Salop, on June 9, 1944, Colonel Frederick William Caton-Jones, *C.B.*, *M.B.*, late *R.A.M.C.*, Retired. Born in South Australia August 24, 1860, he was educated at St. Bartholomew's Hospital, and took the *M.B.* London, in 1884. Commissioned Surgeon May 30, 1885, he was promoted Surgeon Major May 30, 1897, Lieutenant-Colonel *R.A.M.C.* May 30, 1905, and Colonel July 14, 1914. He retired August 24, 1917. He took part in the Burmese Campaign of 1886–1888, being mentioned in despatches and awarded the Medal with two Clasps. On the Nile in 1898 he did good service at the Battle of Khartoum, receiving the Egyptian Medal and Star. He served in South Africa 1899–1902, taking part in the operations in Natal 1899 including the actions at Reitfontein and Lombards Kop; Defence of Ladysmith, including the sortie of December 7, 1899; operations in Natal 1900, including action at Laings Nek (June 6 to 9, 1900); actions at Belfast (August 26 and 27, 1900) and Lydenberg (September 5 to 8, 1900). Twice mentioned in despatches he received the Queen's Medal with four Clasps and the King's Medal with two Clasps. He served in France from August 15, 1914, till August 22, 1916, being mentioned in despatches, created *C.B.* and awarded the 1914 Star, British War and Victory Medals. He was *J.P.* for Salop and one of the contributors to "Modern Pig-Sticking," London, 1914, by Major A. E. Wardrop.

NOTICE.

FOUND.

At Ottershaw, on June 12, 1944, a pair of horn-rimmed spectacles in case with note of address of

R.A.M.C. Association. Would owner communicate with Superintendent, Surrey Police, Weybridge.



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No. 1.

Vol. LXXXIII.

Journal

OF

THE

Royal Army Medical Corps



ISSUED

MONTHLY

EDITOR

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Journal of the Royal Army Medical Corps.

Original Communications.

CLINICAL AND PATHOLOGICAL ASPECTS OF TYPHUS IN THE MIDDLE EAST FORCES.

BY MAJOR JOHN CROFTON, M.B., M.R.C.P.LOND.,

Royal Army Medical Corps, Medical Specialist,

AND

MAJOR JOHN C. DICK, M.D.,

Royal Army Medical Corps, Pathologist,

From a Military Hospital, Middle East Force.

TYPHUS is an ever-present threat in wartime but is not a disease with which many British medical men are acquainted. As our findings have differed in some respects from the text-book accounts we have thought it worth while reviewing our ward and laboratory experience. The orientation throughout is that of the clinician. Epidemiological and theoretical aspects are not considered.

The cases reviewed are those which passed through a large British Military Hospital in the Middle East between March, 1942, and October, 1943, the pathological section including, in addition, material from other medical units. Both epidemic, probably louse-borne, and murine, probably flea-borne, typhus were encountered. Considering that, during much of the period, there were very large numbers of cases of epidemic typhus among the civil population the relatively small number among British troops is a tribute to the precautions observed.

CLINICAL ASPECTS.

The Textbook Picture.—In the textbooks typhus is usually described as starting with two days prodromal malaise, followed by rapid rise of temperature, with headache, nausea and maybe vomiting. The face becomes suffused and the patient presents a torpid, "drunken" appearance in the early stages. The rash appears on the fifth day, the initial site varying with the textbook which shows that there is still some doubt about it, and the typical pleomorphic macules and papules, with dusky subcuticular mottling and probably petechiæ later, are soon evident. Thereafter tremor and delirium develop and there may be bronchial catarrh. The fever is maintained at 102°–104° F., the pulse is rapid and the case proceeds to crisis or death some time between the twelfth and fourteenth days. The spleen is variously described as "never," "rarely" or "sometimes" palpable and there is said to be usually a moderate leucocytosis.

Our cases have shown many variations from this description and some of these are examined below. Where percentages are given they are approximate as minute statistical accuracy is meaningless in clinical records.

The clinical material consists of 67 cases. In 47, rickettsial agglutinations performed by Major C. E. van Rooyen [1 and 2] gave a type diagnosis; of these, 28 were murine and 19 epidemic. Five of the former and 15 of the latter were classified as severe, of which one murine and one epidemic were fatal. In 20 cases, the rickettsial agglutination was either indefinite or was not done. Three of these were fatal. The Weil-Felix reaction was positive sooner or later in all cases. All patients, except one Cingalese, were of European origin.

Onset.—Although almost all patients described the onset as sudden, few were admitted before the third or fourth day, suggesting that the initial symptoms were in fact less severe. Headache was almost always present and sore throat in about 20 per cent. About a third complained of cough and in a third of these it was productive, with no significant difference between the murine and epidemic forms. Nasal catarrh was unusual. About 40 per cent complained of shivering, seldom amounting to an actual rigor. In our experience the mode of onset did not help in distinguishing between enteric and typhus.

The Pyrexia.—The duration of pyrexia varied from four to twenty-two days. In only 5 cases, including 2 epidemic and 2 murine, was it under ten days. The range in 41 was ten to fifteen days, and of the remaining 21 cases with more prolonged fever 13 were epidemic in type. Only 6 per cent had a maximal pyrexia of under 102° F., nearly 50 per cent reaching 104° F. or more and 10 per cent 105° F. or more. There was no case of hyperpyrexia.

The fever was of the maintained type though sudden drops for an hour or two, similar to those which may occur when an enteric case is given aspirin, were sometimes noted on the four-hourly chart. Defervescence occurred by crisis in about 50 per cent of the epidemic cases and 30 per cent of the murine. Nine cases in which lysis began before the ninth day were all of murine type. No relapses occurred.

The severity of the attack was not necessarily related to the height of the fever. One patient, usually with murine typhus, might be sitting up, chatting and reading, with a temperature of 104° F., while another with the same degree of fever might be severely prostrated.

The Pulse.—A slow pulse was unusual at any stage and exceptional in severe cases. However, in ten, of which three were later severe or fatal, the pulse was initially slow. In six it remained so throughout but only one of these was severe. A very rapid pulse, 120–140, usually accompanied the onset of toxic symptoms and subsided with the temperature.

The Rash.—In 70 per cent of our patients the rash was first observed on the fourth, fifth or sixth day. In one very mild case none was noted but it may have been transitory and missed. In one severe case, in a Cingalese, only two small spots were found on one occasion though possibly a more widespread eruption was masked by the pigmentation. In about 70 per cent the rash was "typical," that is to say sufficient in itself to suggest typhus. It began as macular blotches on the abdomen or lower chest which soon increased in size and spread to the rest of the trunk, to the arms, often including the palms and, later and less profusely, to the legs. The blotches were bluish-pink, irregular in outline, often $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, sometimes slightly papular, especially on the back. Initially they faded completely on pressure but, in the severer cases, a petechial centre developed after a day or two. The classical greyish subcuticular mottling was very characteristic when present but was often absent in milder cases. The intensity of the rash was usually proportional to the severity of the disease.

The severer eruptions might last for four or five days, leaving a brownish mottling in their petechial areas as they faded, but in milder cases the rash would fade in two or three days and sometimes was noted on one day only.

Congestion of the conjunctivæ often developed at the same time as the rash but sometimes preceded it. One patient had a conjunctival hæmorrhage and several had epistaxis. No other hæmorrhagic phenomena were seen.

Tremor occurred in about 30 per cent of cases and, of these, three-quarters were severe or fatal. It was usually noted about the seventh day, affected mainly the tongue and hands,

was of coarse type, obvious only on movement, and formed a very characteristic sign of the disease. Minor degrees were seen in milder cases.

Torpor was characteristic of all the severe cases, almost always beginning between the seventh and the ninth days (extremes fifth to seventeenth) and usually disappearing with the fever though sometimes lasting a day or two longer. It was not, therefore, an early feature. The patient lay in a peculiar dull, drugged condition and could only be roused to take a partial interest in his surroundings. On recovery, there was often complete amnesia for this period of the illness.

Deafness occurred in eight of the most severe cases, six being epidemic in type and the others probably epidemic. It usually began on or after the seventh day and disappeared with the fever. It was never permanent.

Other mental changes were seen in severe cases, usually in the form of disorientation and confusion. One patient was pathologically mischievous in convalescence, depositing his excreta on the floor if not sharply supervised and regarding a successful deposition as a personal triumph over the nursing staff. A fatal case went through the stages of hypomania on the seventh and eighth days, delirium and confusion on the ninth and tenth and subsultus tendinum from the eleventh, finally passing into a fatal coma on the fifteenth. Another developed mental symptoms of the Korsakov type two days before the crisis and continued to give detailed, but entirely mythical, accounts of his doings for a further fortnight, in spite of rapidly improving physical condition. No permanent mental changes were seen in any case.

The spleen was palpable in thirty cases, or nearly 50 per cent, most commonly from the fifth day but occasionally (three cases) as early as the second. It was not usually very large and often remained palpable for a day or two only. There was no significant difference in this respect between the murine and epidemic types.

The Chest.—Râles or crepitations were noted in thirty cases, of which twenty were severe. The signs were hypostatic, varying with the position of the patient and more extensive the worse he was. There was no clinical evidence of consolidation in the acute stages though pneumonia occurred as a sequela in two cases and lung abscess in one. Some cough accompanied the chest signs but it was seldom distressing and sputum, if present, was mucoid rather than purulent.

The Smell.—A smell, variously compared to that of mice, of gunwashings or of well-polished boots, has been recorded by gifted observers. In severe cases such an odour was certainly detectable but little more imagination was required to note it in the sweaty victims of other afflictions.

The Bowels.—Constipation was the rule but nine cases, all severe, had diarrhoea at and for varying periods. We saw no stools resembling the classical "pea soup" of enteric but, in our experience, when diarrhoea is actually present in the latter the appearance of the stool often differs from the decencies of textbook medicine so that an atypical stool is not necessarily in favour of a diagnosis of typhus.

Incontinence of urine, and often of faeces also, occurred in eleven cases, of which four were fatal.

The Leucocyte Count.—Our findings are best summarized in the following table where the counts are compared with those in a series of forty-four unselected cases of enteric fever. The counts in both series were taken early in the disease at a time when they were relevant to the diagnosis.

	TYPHUS (44 cases)	ENTERIC (44 cases)
Total W.B.C.s under 5,000 per cu.mm.	10 cases	16 cases
5 to 10,000 per cu.mm.	26 cases	25 cases
over 10,000 per cu.mm.	8 cases	3 cases
Total W.B.C.s under 10,000 per cu.mm. with neutrophils 70% or over	13 cases	9 cases
Max. total count (neutrophils in brackets)	24,000 (85%)	14,350 (80%)
Min. total count (neutrophils in brackets)	3,200 (62%)	2,150 (40%)
Max. percentage neutrophils	90%	85%
Min. percentage neutrophils	35%	38%

It will be seen that, although counts in enteric tend to be lower, the white count is of little value in the differential diagnosis of an individual case. There is, however, a tendency for the counts to be higher in severe cases of typhus, only one such in our series having a count under 5,000. It has been suggested that a series of rising blood-counts is a serious prognostic sign. We found a glance at the patient himself more useful.

Effect on General Condition.—In all severe cases there was a very considerable loss of weight, often 2 to 3 stones. Convalescence in these patients was a matter of months. Mental debility was very much less, the convalescents being normally very cheerful and, perhaps because of their manifest physical deficiencies, surprisingly free from functional overtones.

Treatment.—Typhus provides one of the greatest tests of nursing skill and we attribute the low mortality of our series partly, indeed, to the previous good health of the patients but mostly to the very high standard of the nursing. The following points are worth comment :—

(1) Position : The majority are best nursed flat but should be frequently turned to either side to avoid hypostatic congestion. If there is any evidence of this the advantage of a more upright position must be weighed against the capacity of the heart, as judged by pulse and blood-pressure, to stand up to the increased strain.

(2) Fluids : An intake and output chart should be kept for all cases and the intake must be kept sufficient to ensure an output of at least 2 pints of urine a day, more if possible. This usually means an intake of 5 to 7 pints, depending on the weather, and may require great skill and persistence to attain. It was, however, usually achieved and intravenous infusions, undesirable in cases with hypostatic congestion, thereby avoided.

(3) Food : In this grossly debilitating disease adequate nutrition is extremely important. Tastes must be individually studied. Our patients were fed two-hourly, milk, variously flavoured, and egg-flips forming the basic ration, supplemented as far as possible by minced chicken or fish, purée vegetables, eggs, thin bread and butter and milk puddings. Fruit juice and marmite or vitamin tablets were given in the acute stages and vitaminized oil (vitamins A and D), too nauseous for a really ill patient, in convalescence. Vomiting occurred occasionally but never seriously interfered with nutrition. We can attach only a mystical value to the exhibition of the classical port wine or other forms of alcohol.

(4) The mouth requires constant attention.

(5) Sedatives : Simple barbiturates or a mixture of chloral, bromide and tincture of opium were usually adequate.

(6) Aperients should be avoided as liable to give rise to intractable diarrhoea. If the patient is uncomfortable an enema may be given.

Specific Treatment.—(1) The sulphonamides : Several severe cases, especially those with chest complications, were treated with sulphapyridine or sulphathiazole. There was no ameliorating effect, the patients becoming, if anything, more toxic.

(2) Convalescent serum : This is best obtained within three weeks of defervescence as the titre of the rickettsial agglutinins rapidly falls thereafter. At that period, live rickettsiae may be still present in the blood so that we were advised against its use in sporadic cases which could not be definitely diagnosed as murine or epidemic until late in the disease. However valid this objection may have been in our series serum therapy would be well worth a trial in an epidemic.

(3) Atebrin [3] and minute doses of typhus vaccine were tried in two small series of our later cases but the numbers are at present insufficient for any definite conclusions to be drawn.

Complications and sequelæ were remarkably few, apart from the broncho-pneumonia and mental changes already mentioned. Thrombosis of the femoral vein occurred in one case and one developed a lung abscess which subsided rapidly on postural drainage.

Diagnosis.—In sporadic cases diagnosis is seldom possible before the development of the rash on or about the fifth day. Its appearance is often pathognomonic, especially if followed in a day or so by torpor, tremor and deafness perhaps accompanied by basal râles. In many cases, however, even then the diagnosis is difficult. We have seen one case of typhoid and two of paratyphoid A in which a generalized rash, appearing about the fifth or sixth day and, in

one case followed by torpor and tremor, closely resembled the typhus eruption. A blood culture should be done in all cases and, if the Weil-Felix reaction does not become positive later in the disease, urine and faeces should be examined for enteric organisms. As mentioned above diarrhoea may occur in either disease and the white blood count is not necessarily of assistance.

The transient rash of glandular fever may resemble the transient rash of mild typhus and may cause initial difficulty in diagnosis, especially as the glands may not be grossly enlarged in one type of glandular fever encountered in the M.E. and the blood changes may be late or minimal. However the rash of glandular fever is usually more symmetrical and the fever, in the type that gives rise to difficulty, usually subsides within a week to ten days. In one case of measles typhus was initially considered as a possible diagnosis but usually measles is readily identified by its well-known characteristics. Sulphonamide eruptions or those due to various septic conditions sometimes resemble a very early typhus rash but further observation usually suffices to distinguish between these possibilities. The early macular rash of smallpox may also cause confusion but, here again, a wait of twenty-four hours makes the differentiation clear.

In mild cases of typhus, with atypical rash, diagnosis may have to await a positive Weil-Felix reaction on or after the tenth day. Even in the absence of a rash a Weil-Felix reaction should be done in any obscure and prolonged fever in which there is a high maintained temperature and a relatively fast pulse.

Murine typhus tends on the whole to be milder than epidemic but the two cannot be differentiated on clinical grounds alone.

Deaths.—There were in all five deaths of which one was proved to be due to the epidemic strain, one to the murine, two were, on epidemiological grounds, probably epidemic and one was of uncertain type.

The overall mortality was about 7 per cent with a relative preponderance of deaths in the epidemic group.

In all fatal cases death was due to the toxic effects of the disease and occurred at various times between the tenth and the nineteenth day. These cases all showed some mental symptoms and signs of hypostatic congestion of the lungs.

Auricular fibrillation, premature beats, hiccough and contraction or irregularity of the pupils were noted in different cases in the days immediately preceding death.

THE WEIL-FELIX REACTION.

During the period from March, 1942, to October, 1943, 427 Weil-Felix reactions were performed on 249 cases, including 74 of typhus fever.

Higher titres were taken as definite positives, only one exception being found in the series—a case of paratyphoid B fever.

Major C. E. van Rooyen kindly performed rickettsial agglutinations on some samples of serum with illuminating results.

POST-MORTEM FINDINGS.

Only the outstanding features will be mentioned as the numbers examined did not warrant extensive description.

Two patients died on the tenth day of illness; at this stage agglutinins to the specific rickettsiae had not yet developed to enable the type to be distinguished, although from associated cases from the same units, both were probably of epidemic type. In both cases, the *rash* was well marked and persisted after death. The *lungs* showed widespread petechial hæmorrhages but, even microscopically, no evidence of inflammatory changes. The *liver* was enlarged and soft and, microscopically, showed central congestion with some necrosis of the cells in the centres of the lobules. The *spleen* was enlarged to about twice the normal size, tense and congested; histologically, small eosinophil areas suggestive of necrosis or thrombosis, infiltrated with macrophages and polymorphs, were present near the central arteries in many of the Malpighian corpuscles; similar areas were found in other conditions, e.g. bacillary dysentery, and were not pathognomonic of typhus. The *lymph nodes* in the

mesentery and para-aortic regions were slightly enlarged but not congested; their structure was obscured by marked reticulo-endothelial activity, loss of germ centres and irregular lymphocytic arrangement with marked infiltration around blood-vessels. The *brain* showed diffuse congestion; microscopically, there were small hæmorrhages, especially in the Virchow-Robin spaces. Very scanty and indefinite nodes of cellular infiltration (a few polymorphs and cells of irregular, "endothelioid" type) were present in the basal ganglia and subcortical region; in view of the finding of large numbers of these nodes in the epidemic case dying later in the disease, it appeared that the nodes were not an early development in these cases.

Three cases ended fatally on the sixteenth or seventeenth day of disease; by rickettsial agglutination, one was found to be epidemic, one murine and in the third the type was not determined. In this last case, three small purpuric spots were present on the skin of the ankle, but no signs of the *rash* were found in the others, post-mortem. In the *lungs* in all cases a hæmorrhagic bronchopneumonia was present; this lesion consisted of numerous very small patches of consolidation, confined to terminal bronchioles and the alveoli immediately surrounding them and well demarcated by a narrow ring of intense congestion. In the murine case, the condition had progressed to abscess formation and the abscesses were grouped round the smaller bronchi like clusters of small grapes, always with very thin and clearly demarcated walls. The *liver* in these cases, was slightly enlarged and firm, but microscopically showed only slight cloudy swelling. The *spleen* and *lymph nodes* showed the same changes as in the earlier cases. Throughout the *brain* in all three, the congestion and small (microscopic) hæmorrhages were again present. In addition, cellular nodes with a whorled arrangement were found; in the murine case, they were scanty and present only in sections from the pons, substantia nigra area of the mid-brain and from the thalamus; not from the cerebellum or cortex. In the case of undetermined type, they were present in small numbers in the subcortical region, mid-brain and pons but were not seen in the cerebellum or thalamus. In the epidemic case, they were numerous in all parts except in the cerebellum, where none was seen. Several of these whorls were formed more or less closely alongside small blood-vessels; in some, in which no definite relationship to a small blood-vessel was apparent, one or more capillaries were seen in the whorl itself; in a few, no connection with blood-vessels was observed. Of the cells in the whorls, the outer layers showed the appearance of neuroglial cells while the central cells were large and irregular, suggestive of reticulo-endothelial cells; a few lymphocytes and polymorphs were occasionally scattered throughout. None of the nodes was formed by the typical vascular endothelium in the lumina of small blood-vessels.

SUMMARY.

(1) The clinical features of a series of 67 consecutive cases of murine and epidemic typhus, treated at a Middle East General Hospital, are reviewed.

(2) Cases of murine typhus tended on the whole to be milder than those of epidemic type, but every degree of severity was encountered in both groups and differentiation could not be made in individual cases on clinical grounds alone.

(3) Diagnostic difficulties in mild or atypical cases are discussed.

(4) The Weil-Felix reaction (positive to a titre of 14:80) was of great value in distinguishing mild and atypical forms of typhus from the welter of obscure pyrexias, although, in typical cases, a reasonably assured clinical diagnosis could be made before the reaction became positive.

Our thanks are due to Major C. E. van Rooyen for performing rickettsial agglutinations, to Capt. A. N. S. Watt for notes on some of the cases, to Lt.-Col. J. G. Scadding for useful criticism and suggestions and to Col. J. R. McDonald for permission to forward this paper.

REFERENCES.

- [1] VAN ROOYEN, C. E., and BEARCROFT, W. G. C. (1943). *Edinburgh Med. Journ.*, L, 257-272.
- [2] STUART-HARRIS, C. H., RETTIE, G. K. C., and OLIVER, J. O. (1943). *Lancet*, ii, 537.
- [3] VAN MEERENDONK (1942). *Deut. Militararzt*, VII, No. 4, 283-4. Quoted in *Bulletin of War Medicine*.

BLOOD TRANSFUSION DURING THE BATTLE OF MARETH, WITH SPECIAL REFERENCE TO PROBLEMS OF SUPPLY.

THE following notes are extracted from a report by Captain H. K. Lucas, R.A.M.C., who, from the Battle of El Alamein onwards, was in charge of the Field Transfusion Unit (F.T.U.) responsible for the distribution of transfusion stores to forward units. The arrangements detailed are typical of those made throughout the campaign.

GENERAL LAY-OUT.

The general lay-out of medical units and of the Transfusion Units responsible for supply is shown schematically in Fig. 1.

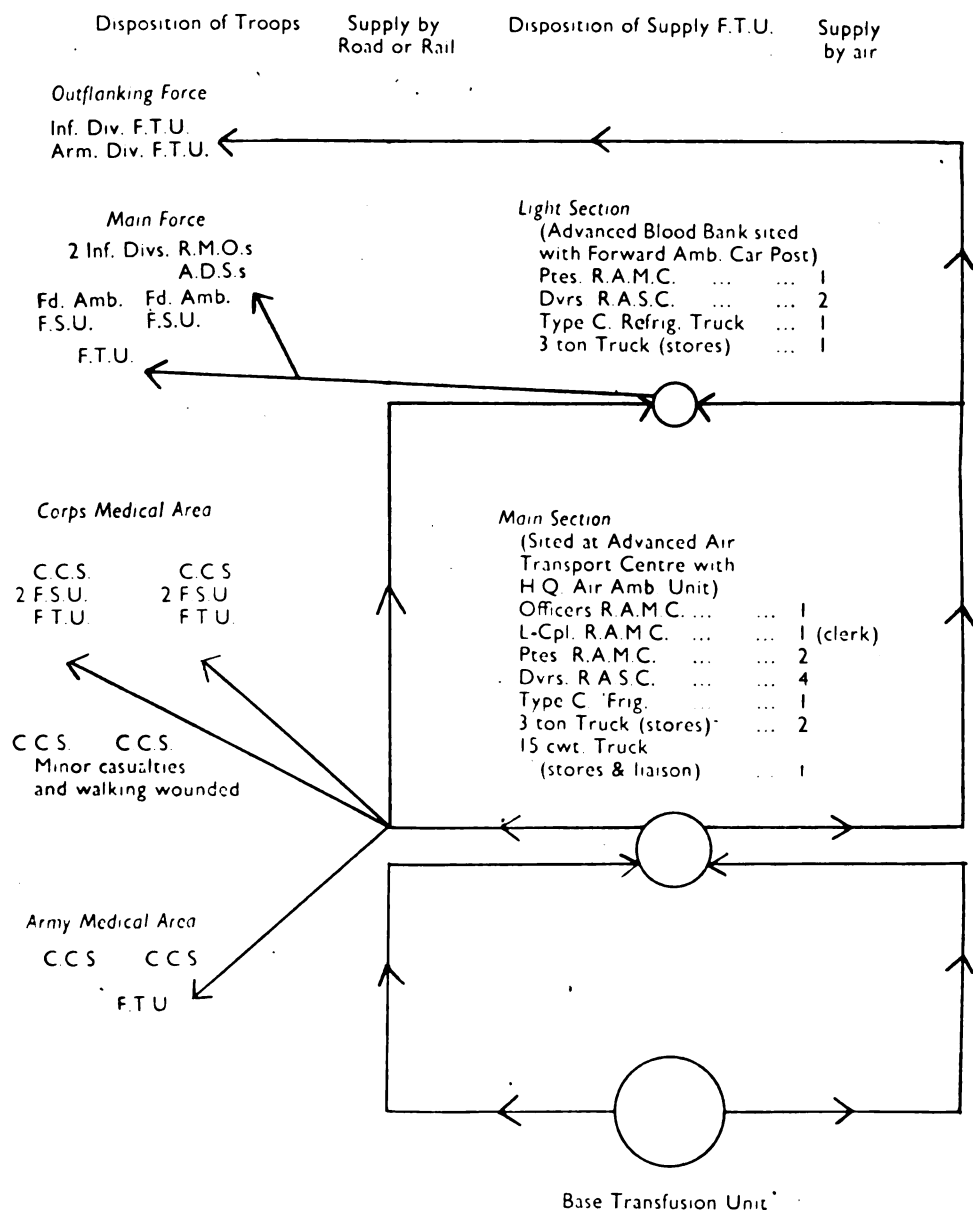


FIG. 1.

Distances vary according to circumstances. In this case the Advanced Blood Bank was about 5 miles behind the front line and the Main Supply Section a further 15 miles back.

OUTFLANKING FORCE.

As soon as serious resistance was encountered by the Mobile Column, one Field Ambulance (Fd. Amb.) opened out as Surgical Centre and a landing strip was prepared close to it for the evacuation of casualties by air. Transfusion stores were carried backwards and forwards from the Main Supply Section by ambulance plane.

CASUALTIES FROM THE MAIN FORCE.

The two Fd. Ambs. used as Main Dressing Stations were kept close together so that surgical facilities could be to a certain extent pooled. The F.T.U. was switched to whichever Fd. Amb. was receiving most casualties. Resuscitation was carried out in the other Fd. Amb. by the unit Transfusion Officer.

Seriously shocked casualties were resuscitated on admission to the Fd. Amb. and desperate cases operated on by the Field Surgical Unit. Cases when fit to travel were evacuated to the Corps Medical Area. In some forty cases a "travelling transfusion" was carried out during the journey (Lucas 1943). This proved of great value.

In the Corps Medical Area all major cases were dealt with in two C.C.S.s before further evacuation by road or air. Each C.C.S. had four operating theatres in action with one F.T.U. carrying out resuscitation for all. These two C.C.S.s were in close proximity and opened and shut alternately every eight hours. It was found that one F.T.U. could resuscitate patients for three surgical units operating simultaneously but, while the surgeons worked in shifts, no relief was available for the F.T.U. personnel. In prolonged battles (none after Alamein produced heavy casualties for more than three days) some relief for F.T.U. personnel is necessary. This cannot be guaranteed from the host unit whose officers are fully occupied.

Two other C.C.S.s in the Corps Medical Area dealt with minor cases and passed them to the Army Medical Area.

In the Army Medical Area two C.C.S.s were served by one F.T.U. Only six battle casualties required transfusion in this area.

TRANSFUSION SUPPLY ARRANGEMENTS.

Base Transfusion Unit.—The Base Transfusion Unit is responsible for all supplies of transfusion apparatus and fluids. In Middle East this unit also undertook the preparation and supply of sulphonamide preparations for intravenous and intraperitoneal use. During a battle the quantity of transfusion stores (exclusive of whole blood) required by a Corps Area was approximately $1\frac{1}{2}$ tons a day, for which fast and reliable transport is essential, e.g. M.T. supplied by either the Base Transfusion Unit or the Main Supply Section between which the stores are carried. For whole blood, air transport is essential. If F.T.U.s are fully stocked with blood at the beginning of a battle about 120 bottles of blood per Corps per day are required for replenishment but this amount obviously varies according to circumstances.

Forward Supply Unit.—Experience has shown that it is essential to have a unit whose sole function is to maintain the supply of transfusion materials in the forward areas. During a battle it is not possible for F.T.U.s to carry out their resuscitation duties and at the same time to fetch and carry supplies. In Middle East an augmented F.T.U. was relieved of other duties and used as Supply Unit. Details are shown in fig. 1.

The Main Supply Section of this unit was sited at the Advanced Air Transport Centre. This is imperative to ensure that consignments of blood arriving by air can be taken over and placed in a refrigerator without delay. The allotment and timing of air transport during a

battle is so uncertain that it is essential for all incoming planes to be met and this can only be done by a unit on the spot. From this section supplies were sent forward to the out-flanking force and, when it was far forward, to the Advanced Blood Bank by Air Ambulance. Supplies to nearby units including, in normal circumstances the Advanced Blood Bank, were made by a daily "delivery round" in the unit transport. This served a double purpose; all issues, except blood, were made on an exchange basis and the return of empties was therefore ensured—a very important point.

A further duty of the officer in charge of this unit was to maintain contact with administrative medical officers, to obtain information regarding anticipated casualties and to place demands accordingly on the Base Transfusion Unit. This control of supply had a considerable effect in decreasing wastage.

The Light Section (Advanced Blood Bank) was fed by the Main Section and distributed to forward units. It was sited with the Forward Ambulance Car Post of the forward M.A.C. through which all ambulances check out and in and therefore had up-to-date information of the location of medical units—a very important point in mobile warfare. The Light Section made a periodic delivery round to all the units it served.

It emerged as a general principle that, in the Corps Area and forward, it was not safe to rely on any form of communication other than personal contact and that the "daily round" was essential to ensure smooth supply.

SCALE OF TRANSFUSION EQUIPMENT.

The standard scale of transfusion equipment carried by medical units of 8th Army is shown in Table I.

TABLE I.—SCALE OF TRANSFUSION EQUIPMENT FOR MEDICAL UNITS IN EIGHTH ARMY.

	<i>General Hospitals</i>	<i>C.C.S. Hvy. Sn.</i>	<i>C.C.S. Lt. Sn.</i>	<i>Field Amb.</i>	<i>Lt. Field Ambulance</i>
Taking and giving sets complete	12	12	6	6	6
Extra giving sets without needles	12	12	6	6	16
Needles B.T.*	12	12	6	6	6
Cannulæ*	6	6	3	3	3
Citrate bottles	24	24	—	—	—
Plasma or serum wet or dry, btls. with 1 giving set per 2 bottles	48	36	24	36†	36†
Grouping serum, dry	6	6	6	6	6
Glucose saline	48	48	12	12	12
Sulphanilamide saline	24	24	6	0	0
M.E. sets	6	—	—	—	—

*Needles and cannulæ will not be exchanged, but will be retained, cleaned and sterilized by the unit; if necessary, needles can be sent to Det. No. 1 Base Transfusion Unit for resharpening.

†This item contains 6 small boxes, each containing 2 dried plasma, distilled water, and 1 giving set for distribution to R.M.O.s if required.

This scale was augmented as required—i.e. Fd. Ambs. likely to be heavily involved were given two extra boxes of serum while those which acted as hosts to Field Surgical Units carried additional glucose saline and sulphonamide preparations.

During periods of calm, F.T.U.s maintained their refrigerators about half full of blood. For about seven days before the battle opened 100 bottles of blood a day was flown up until they were fully stocked (over all total about 800 pints). In addition, stocks of plasma, serum, saline and sulphonamide preparations were augmented.

SUPPLIES AVAILABLE FROM THE TRANSFUSION SERVICE.

- (1) Whole blood.
- (2) Dry plasma and distilled water.

- (3) Wet serum or plasma.
- (4) Glucose (5 per cent) and saline (0.3 per cent).
- (5) Sulphonamide drugs.
 - (a) Sulphanilamide 0.5 per cent in normal saline (for intravenous administration).
 - (b) Sulphanilamide 4 per cent, dextrose 20 per cent, sod. bicarb. 4 per cent, in 100 c.c. bottles for addition to glucose saline.
 - (c) Sulphanilamide 5 per cent in glycerine, in 100 c.c. bottles (for direct application to wounds, particularly synovial membranes).
 - (d) Sulphathiazole pulv. 10 grammes, sterile, in test-tubes.
 - (e) Sodium sulphathiazole solution 30 per cent, in 10 c.c. ampoules.
 - (f) Sulphathiazole 3 per cent in glycerine, in 100 c.c. bottles (for intraperitoneal application).
 - (g) Sulphadiazine suspension, 10 grammes, in 100 c.c. bottles (for intraperitoneal application).
 - (h) Sod. sulphadiazine solution 30 per cent, in 100 c.c. bottles.
- (6) Sod. citrate 4 per cent, sod. bicarb. 4 per cent, in 100 c.c. bottles for intensive alkali administration.

TRANSFUSION WORK CARRIED OUT IN ONE CORPS OVER A PERIOD OF TEN DAYS.

This analysis comprises the transfusions carried out over a period of ten days (March 16 to 25) in 8 Fd. Ambs., 3 F.T.U.s, and 2 C.C.S.s.

Casualties were not on a heavy scale and therefore received adequate attention early. The units concerned were experienced in transfusion and were aware of the necessity for conserving supplies. At no time was there any shortage of blood.

TABLE II.

Location			Battle Casualties Admitted	Number of Transfusions Performed	Percentage Admissions Transfused	Bottles	
						Blood	Plasma
Seven A.D.S.s	..	..	1,393	32	2.38	0	63
Eight M.D.S.s	..	..	1,359	100	7.36	314	128
Two C.C.S.s	..	..	985	102	10.35	228	61
TOTALS	..	..	3,737	234 (a)	(b)	542	252

(a) This is not the number of patients transfused as casualties transfused in A.D.S.s and M.D.S.s in a number of cases receive blood later in C.C.S. The accurate number of casualties treated by transfusion is not known but is probably 180 to 200.

(b) A total is not shown in this column: in consequence of (a) as this would be misleading. The figure is estimated at 13 to 15 per cent.

PENETRATING ABDOMINAL INJURIES.

The transfusions carried out on penetrating abdominal injuries are shown in Table III.

TABLE III.

Penetrating Abdominal Injuries, March 16—25.

FIELD AMBULANCES.

(a) Total admitted to M.D.S. of which record could be found (2.65 per cent of admissions) ..	37
(b) Died after admission (pre-operation)	3
(c) Died shortly after operation	4
(d) Died before further evacuation (within two days)	4
(e) Evacuated before operation (11 of these were sent back with travelling transfusions in progress)	22
(f) Held in Field Ambulance during post-operative period (includes (d) above)	8

Fluid used on these cases.

(a) On 37 cases admitted :	Blood 67	Serum 17	G-saline 110
(b) On 8 cases immediately surviving operation :	Blood 45	Serum 8	G-saline 110
Per case :	Blood 5.6	Serum 1.0	G-saline 13.75

CASUALTY CLEARING STATIONS.

Cases operated	22
Deaths within twenty-four hours	3
Fluids used :	Blood 40 Serum 3 G-saline 365
Fluids used per case :	Blood 1.8 Serum 0.14 G-saline 16.6
Average over whole area, 37 cases :	Blood 127 Serum 20 G-saline 475
Per case :	Blood 3.5 Serum 0.54 G-saline 12.8

It is regretted that details of these cases are not as complete as might appear desirable but figures were asked for with a view to discovering the volume of fluids used. It is not the object of this report to deal with the surgical aspect of these cases.

TABLE II (contd.).

Used			Average per 100 Casualties.			
Average per transfusion						
Total	Blood	Plasma	Total	Blood	Plasma	Total
63	0	1.97	1.97	0	4.54	4.54
442	3.14	1.28	4.42	23.10	9.45	32.52
289	2.23	0.60	2.83	23.15	6.17	29.32
794	2.32	1.10	3.42	46.25	20.13	66.38

A SYNDROME OF GENERALIZED LYMPHADENITIS WITH NEUTROPHIL LEUCOPENIA.

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INTRODUCTION.

ON May 31, 1943, a soldier with a mass of glands in the right axilla was admitted to the Surgical Wards of a New Zealand Hospital in Tripolitania. Other glands were found enlarged, a provisional diagnosis of tuberculosis or Hodgkin's disease made and a biopsy was proposed but, after two to three days, the mass of glands had almost subsided and a further provisional diagnosis of infective mononucleosis was substituted though later a negative Paul-Bunnell test was found.

Five days after his admission two Medical Officers concerned in his care took ill with a febrile disease and later developed generalized lymphadenitis and neutrophil leucopenia.

It later became obvious that a mild epidemic of similar cases was occurring in the Sisters' Mess and among troops camped in the vicinity and that this disease was not typical infective mononucleosis.

This paper describes the findings in 25 selected cases whose records were most complete.

GENERAL DESCRIPTION.

In general, the syndrome is characterized by a short, usually mild bout of pyrexia which the victims describe as "like a mild sandfly fever." This is followed by a more or less generalized tender enlargement of lymph glands lasting five to fifteen days and a transient leucopenia, as low as 3,000 or less, chiefly affecting the neutrophil cells which may drop as low as 9 per cent (315 neutrophils).

Glands.—The glands varied greatly in size from that of an almond (1.5 to 2.5 cm.) to small shotty glands a millimetre or so in diameter. Most cases had at least one group of larger size. In some cases these larger glands appeared to be draining an area subject to recent sepsis such as "Desert Sores" or, in one Sister, furuncles of the aural meatus.

The consistency varied. The larger glands were soft and "fleshy." After a few days enlargement these would become suddenly smaller over a twenty-four hour period being transformed into smaller and firmer glands which might not have entirely disappeared when the patient was discharged.

The posterior cervical glands were usually the first to appear but, in a few cases, the inguinal group was the first noted. As previously stated sepsis seemed to determine both the size and early appearance of glands in some cases. Any or all of the superficial groups were involved in this enlargement, which was not necessarily symmetrical; one axillary group only might be involved. Both pre- and post-auricular glands, occipital glands and epitrochlear were commonly enlarged.

No particular predilection for side was noted but enlargement of cervical glands, deep to sternomastoids, and the supraclavicular group was invariable. In two cases vague abdominal pain was a presenting symptom, possibly due to enlarged abdominal glands.

The first patients in this series were Sisters or Medical Officers who endured the mild pyrexia without reporting sick and only reported when obvious glandular enlargement was

present. It was then thought that the gland enlargement followed some days after the pyrexia. However it later became obvious that most cases had enlargement on admission and, in a few cases studied from the onset, it appeared that there was slight glandular enlargement within forty-eight hours.

In most cases the generalized enlargement had disappeared within ten to fourteen days but the first group to appear was still often palpable. The spleen was palpable in only 3 of 25 cases.

Febrile Bout.—Most patients who had had sandfly fever described this as like a "mild sandfly infection." There was the same frontal headache with retro-ocular pain and mild aching in back and limbs. The average duration of pyrexia was five days with seven days as a maximum. Most cases had had one to two days pyrexia before admission. One case had a "relapse" with a fresh gland involvement commencing two days after the finish of the first bout and lasting two days. The pyrexia was rarely above 102° but occasionally reached 104° . In a number of cases the pyrexia was nocturnal only.

Other Symptoms.—Excessive lassitude or fatigue, with considerable difficulty in concentrating on work, was reported by many of the cases, especially the Sister-Medical Officer Group, who attempted to work through the attack.

A very constant feature was complaint of "stiff neck" which is believed to be analogous to that seen in infective mononucleosis and to be due to early inflammation of subadjacent glands. This proved to be a most helpful early sign in "spotting" the disease. Two cases, a Medical Officer and a Sister, noted polyuria for twelve to twenty-four hours during the pyrexial bout. The significance of this is unknown and, though inquired for, was not seen in subsequent patients. Nevertheless it should be noted that ward temperatures were ranging from 85° to 120° and conditions were such as would explain all but the most pronounced polyuria.

Many cases showed a transient pharyngitis—an injection of mucosa only.

Rash.—One case only developed a rash on the eighth day lasting forty-eight hours. This was an ill-marked erythematous rash mainly confined to back and chest and showing no special characteristics.

Icterus.—Two cases were accompanied by icterus—apparently a coincidental infective hepatitis but mentioned here on account of recent reports of icterus with infective mononucleosis. One case was a N.Z. W.A.A.C., on the Hospital Staff, in whose Mess a small epidemic of infective hepatitis had occurred. Jaundice appeared four days after onset of pyrexia with a white cell count of 4,000 and a neutrophil count of 30 per cent. Generalized tender glandular enlargement appeared four days later. This patient was exposed to both infections. In the other case jaundice developed on the tenth day after admission for tender glandular enlargement with characteristic blood changes.

BLOOD PICTURE.

General Findings.—On the whole the characteristic features were the low white count, the absolute neutropenia and, in most cases, the appearance in increased numbers of an abnormal cell type. The figures for the total white count varied, usually dropping to about the 4,000 level, but in occasional cases remaining at a normal level throughout. There was an absolute decrease in neutrophils and, usually, only a relative increase in lymphocytes. At this time an abnormal type of cell appeared and for convenience was designated "atypical mononuclear."

Neutrophil Counts.—The neutrophils showed an absolute decrease, in all cases, shortly after the onset of symptoms, when the total white count usually commenced to drop until it again reached its normal level—usually round the 7,000 mark.

In this series of twenty-five typical cases blood examinations were carried out every few days. In only one case was the neutrophil count above 40 per cent of the total white count. In this case the figure recorded was 43 per cent—the white count being 3,900 per c.mm. The absolute figures for the neutrophils varied between 315 and 2,470 per c.mm.

The neutrophil count was below 45 per cent of the total white count for periods varying from one to eight days with an average of 3·8 days.

The following table gives an idea of the drop in neutrophils and the number of patients in each group. One case is omitted.

<i>Total neutrophils per c.mm.</i>						<i>No. of patients</i>
Under 500	..	..	..	..	..	1
500—1,000	..	..	..	..	..	3
1,100—1,500	..	..	..	..	..	9
1,600—2,000	..	..	..	..	..	6
2,100—2,500	..	..	..	..	..	5

Normal figures (Whitby and Britton), were taken as follows :—

Total whites	4,000	10,000 per c.mm.	
Neutrophils	3,000	6,000 per c.mm.	60—70 per cent
Lymphocytes	1,500	2,700 per c.mm.	25—30 per cent

Two of the cases were interesting as illustrating varying features.

Patient "A" showed the characteristic drop in neutrophils, an absolute lymphocytosis and appearance of increased "atypical mononuclears," while the total white count remained normal.

Patient "B," a relapse case, showed a low white count at onset, a sudden return of neutrophils to normal, a further drop of neutrophils accompanied by "atypical mononuclears" and, again in this case, an absolute lymphocytosis. The counts illustrating the above are shown below :—

Patient "A"

<i>Date</i>	<i>Total White Count</i>	<i>Neutro. %</i>	<i>Lym. %</i>	<i>Increased "Atypical" Mononuclears "</i>
11.7.43	7,200	71	25	—
12.7.43	7,000	60	32	—
13.7.43	7,000	16	73	+
15.7.43	7,500	33	56·5	+

Patient "B"

4.7.43	3,900	38	56	—
5.7.43	6,500	52	41	—
8.7.43	4,300	62	37	—
9.7.43	4,900	55	41	—
11.7.43	6,800	29	62	+
12.7.43	9,000	36	62	+

It must be admitted that a neutropenia may occur in malaria and other diseases, causing a leucopenia and, in one such case of B.T. malaria, a neutrophil count as low as 19 per cent (1,102 cells per c.mm.) was found but enlarged glands were not present.

Lymphocyte Counts.—In the majority of cases the lymphocytic increase was only relative and not absolute. When the white cell count dropped to about 4,000 per c.mm. and was accompanied by this relative increase in lymphocytes it was noticed that there was an increase in the abnormal type of cell resembling, but differing in some aspects from, the Türk Irritation Cell.

Such cells have been noticed in very small numbers, prior to this outbreak, in blood films showing a decreased white cell count accompanied by a relative lymphocytic increase, a finding later confirmed in such cases, particularly in some positive malarial films.

The numbers of such cells were usually in the neighbourhood of $\frac{1}{2}$ per cent or less of the differential count. In the films of the glandular cases the increase was more noticeable being in the neighbourhood of 2 to 3 per cent. Such cells appeared either when the white count was at its lowest figure or, more often, when the count commenced to rise again—the relative lymphocytosis being most marked about this time, usually 60 to 70 per cent.

That this increase in abnormal cells was fairly characteristic of this form of glandular disease was shown in one case when a newly admitted patient with P.U.O. had a routine blood film examined for malaria and showed a 3 per cent figure of these abnormal cells. Subsequent examination of the patient proved that he was an example of this syndrome.

The cell in question, although varying slightly in size, is intermediate between the small and large lymphocyte with usually an eccentrically-placed nucleus. It has very deep blue staining cytoplasm, evenly granular in appearance, and a round or oval-shaped nucleus, also very deep staining, so deep usually that it is hard to differentiate nucleus and cytoplasm (Leishman stain) except by the difference in colour between the deep blue of the cytoplasm and deep violet of the nucleus.

Except for this very deep staining nucleus it resembles the Türk Irritation Cell and may possibly be just a variant of this cell. The nucleus is usually too deeply staining to allow of its structure being seen in detail but appears to be reticular in type. No evidence of vacuolation in the cytoplasm was observed in any of these cell types nor were azure granules present.

Cell types intermediate between the normal lymphocyte and this cell were noticed before the total white count reached its lowest point and during its rise to normal figures again.

These "intermediate" cells, on the whole, were slightly larger in size and more closely resembling the Türk Cell, with paler, evenly staining nucleus and a less granular but evenly staining deep-blue cytoplasm which, on occasions, contained clear unstained vacuoles.

The appearance in increased numbers and disappearance of the abnormal deeply staining type, or "atypical mononuclear," was usually quite sudden, appearing and disappearing in a day or so—very seldom remaining beyond a maximum of three days.

A few cases failed to show any of these typical types during the course of the illness but, otherwise, showed the usual features.

Brigadier L. E. H. Whitby, who examined some of the "atypical" cells, would not commit himself beyond saying that they were obviously abnormal types.

Other Leucocytes.—There was no variation of other cell types in all the cases examined. The monocytes were not increased in any of the cases and showed no abnormality.

Sternal Puncture.—This was carried out on two of the typical cases with inconclusive results.

Paul-Bunnell Test.—Agglutination tests were carried out in ten cases against suspensions of sheeps' corpuscles. All, however, gave normal results. Two other cases, not included in the present series, also gave normal results (i.e. negative tests). These tests were performed on two groups of patients and included some of the earliest and some of the latest cases in the series. In seven the tests were performed between the tenth and twentieth days, two being repeated after forty-five days. In the other three the tests were performed thirty-five days after the onset.

EPIDEMIOLOGY.

The mode of spread is quite unknown. In a community subject to a mild epidemic it is unsafe to guess at an incubation period. The following facts may be stated for future consideration. Following the admission of the first (probable) case two Medical Officers, who saw him, developed fever five days later followed by the typical syndrome. One of these officers went away for a week-end during the pyrexial period and, seven days later, two of his companions—Medical Officers of a neighbouring unit—took ill with similar symptoms. There was, however, considerable interchange of visits between the units.

In an Officers' Mess, numbering about 25, 5 officers and the Mess Corporal were taken ill. The two first cases were admitted to hospital on June 11 and 12. A further case appeared on June 20 and three cases on June 23, 25 and 27.

It is possible, therefore, that the incubation period may prove to be about seven days.

GEOGRAPHICAL DISTRIBUTION.

All except three of these cases had been encamped within a radius of 15 miles of Tripoli on admission. Of the remaining three, two were evacuated from Sicily, having previously

been in Tunis and Sfax. The third was also evacuated from Sicily just after his arrival from Tripoli and he stated he was not well when he left this area.

In addition, it is noted that other hospitals in the Middle East have reported "atypical" cases of so-called "glandular fever." (Quarterly Report, Consultant in Tropical Med., M.E.F., September 19, 1943.)

The blood-count was stated to be "normal" in one series but, in view of the transitory nature of the neutrophil leucopenia, this feature may have been missed.

NATURE OF SYNDROME.

The causative organism is unknown. A biopsy of a lymph gland has not been done in the present series.

Owing to the exigencies of the Service no access to literature is possible at present and it is not known if similar cases have been reported in the past.

The salient features of the cases described were a febrile attack associated with general glandular enlargement followed, after a two to seven day interval, by a reduction in circulating neutrophils.

In the course of the "epidemic," however, two or three cases out of forty were seen, clinically typical but without the marked drop in neutrophils. In two of these it seemed unlikely that such a drop could have been missed if it had occurred.

Though there is a superficial clinical resemblance, it is obvious these are not cases of Infective Mononucleosis. The blood counts are consistently different and the Paul-Bunnell test negative in all cases on which it has been performed.

The combination of lymph glandular enlargement and neutrophil leucopenia occurs in many diseases of viral causation, from rubella to the sandfly-dengue group. It is quite obvious that these cases were not in the exanthem group nor did they show the features of Mosquito Dengue.

One of the authors (J. D. C.) saw a series of cases, in the autumn of 1940, in troops who had recently come from Palestine to Egypt. These cases were called "sandfly fever," but had glandular enlargements somewhat resembling those in the present case—blood counts were not done. No sandfly fever epidemic has occurred in this area during the period under discussion and only a few sporadic cases resembling sandfly fever have been admitted to this hospital. Nevertheless it would appear possible that these cases were somewhat unusual types of sandfly (phlebotomus) fever or due to an unknown virus of the sandfly-dengue group.

On the other hand, cases of "atypical" glandular fever with negative Paul-Bunnell tests are reported to have occurred in England (personal communications) and the present cases may belong to a geographically widespread group related to infective mononucleosis.

SUMMARY.

(1) Twenty-five cases showing febrile glandular enlargement, a neutrophil leucopenia and a negative Paul-Bunnell test are reported. These cases were selected from more than forty cases appearing in a small epidemic between May 31, 1943, and August 11, 1943.

(2) The circulating neutrophils were under 2,500 per c.mm. in all cases and varied from 315 per c.mm. to 2,470 per c.mm.

(3) An atypical cell, somewhat resembling a Türk Irritation Cell is described. The number of these cells present reached 2 to 3 per cent of total white count. Occasional cells of this type have been seen in other cases with low neutrophil counts, e.g. malaria.

(4) The causative organism is unknown. It is suggested it may be a virus related to either that of infective mononucleosis or the sandfly-dengue group.

ACKNOWLEDGMENTS.

Our thanks are due to Colonel Gower, Officer Commanding a N.Z. General Hospital, and to Brigadier S. Kenrick, D.M.S., H.Q., 2 N.Z.E.F., for permission to forward this paper.

TRAUMATIC SURGERY ON THE LINE OF COMMUNICATION; A CLINICAL RECORD.

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DURING the past two years approximately 1,700 battle casualties and 616 accidental injuries including 145 burns have passed through a small hospital acting as a staging section in the line of evacuation from the forward areas in the Western Desert and in Sicily.

The Surgeon at such a unit misses the opportunity of dealing with most of his casualties at first hand as at a C.C.S. and that of watching his cases till finally healed as in hospitals at the base. Nevertheless a review of these cases reveals many points of surgical interest, some of which have been selected here for discussion.

GENERAL TREATMENT: SHOCK.

Approximately 200 of our battle casualties came to us at one site *via* hospital ship; they were of course in excellent condition. The rest have come in ambulances, their condition varying with the stage of the campaign and the length of the journey. Cases in the Western Desert, clad merely sometimes with bandages and a smile were often in a peculiarly exhausted state from their long jolting over bumpy desert tracts, often in dust storms, some having been very recently prisoners of war. Their morale was always excellent. A Guards Serjeant with a shell wound, right elbow, on being told he had a fractured humerus remarked cheerfully, "Well, sir, I thought I heard a bit of a rattle in it sometimes."

Great improvement was noticed in every case following general nursing and a good sleep in a good bed. In the desert enemas were frequently required, with consequent great relief, as attention to the bowels had evidently been limited on their travels. It was considered that the improvement produced in the general condition by this break in the journey more than compensated for the added delay in getting the cases to their respective special centres—Head, Chest, or Orthopaedic.

Many cases required in addition treatment for shock. The establishment of a Resuscitation Section with trained staff for giving whole blood, plasma or glucose saline is one of the most notable advances of recent surgery. The desire to do something in the theatre must be curbed till the general condition has been made satisfactory. This is specially so in the treatment of burns where many hours of continuous plasma may be required before the patient is even fit to have his clothes removed.

The Resuscitation Section at this hospital has been under the charge of Major J. E. Craik, R.A.M.C., and has been fully occupied. Every serious case has been referred to him and his co-operation has been of immense value in the treatment of all major wounds. He has made a large series of observations in blood-pressure readings, blood urea and hæmoglobin percentages which do not come within the scope of this article.

HÆMORRHAGE.

At the M.E.F. Surgical Conference, 1942, Colonel Stout, Consultant Surgeon, New Zealand Expeditionary Force, stressed the importance of the complication of hæmorrhage in wounds. Several cases of severe secondary hæmorrhage in wounds of limbs and two cases with hæmorrhage occurring within forty-eight hours and classed as "reactionary" have amply confirmed us of his views.

The problem in these cases was whether to open up the local wound and control the hæmorrhage locally or whether to ligate the main vessel higher up. The first procedure

meant a hunt in the depths of an inflamed wound for the bleeding point in a debilitated toxic patient in no state to stand a prolonged operation, not necessarily entirely successful. Packing a grossly septic wound was not considered a satisfactory procedure. The alternative was to operate in a clean site higher up, possibly under local anæsthetic, with the minimum of disturbance, by ligating the main trunk to control the hæmorrhage with certainty and with a minimum of shock.

Case 1.—Lance Corporal H. Battle casualty of 5.3.43. Multiple penetrating mine wounds of face, forehead, left eye, abdomen, thighs, compound fracture of phalanges right thumb. 7.3.43: Laparotomy. No hollow viscus injury. False aneurysm noted forming in left Scarpa's triangle. 14.3.43: Left evisceration for septic endophthalmitis. 23.3.43: Admitted here. Pressure sore left buttock redressed. Large reddened tense non-pulsatile swelling, left Scarpa's triangle, incised. Much clot evacuated. Two pints blood transfusion given post-op., 1 pint blood on 28.3.43 and, again, on 4.4.43. Hb. now 71 per cent. 5.4.43: Slight hæmorrhage from the small penetrating wounds and incision in left Scarpa's triangle. 6.4.43: Severe hæmorrhage from these places. Left external iliac artery and vein ligated under 2 per cent novotux local anæsthetic. Then, under 0.25 g. pentothal, clots and pus were evacuated from the left Scarpa's triangle; hæmatoma found filling the whole of the upper half left thigh. Patient died three hours later. Post-mortem showed an irregular hole in the anterolateral aspect of the femoral artery $3\frac{1}{2}$ inches below Poupart's ligament; round this there was a circular layer of laminated blood clot, presumably the neck of a false aneurysm. The femoral artery was patent proximal to the false aneurysm but distal to it for 2 inches was thrombosed. The whole area was septic.

In this case with several wounds, each in itself a source of anxiety, the cause of death was secondary hæmorrhage. It was felt that: (1) A mistake was made in the first place in taking the false aneurysm for an abscess; this error may occur quite easily, much clot masking the pulsatile nature of the swelling (Debenham, 1943). (2) The artery should have been tied off earlier, preferably on the evening of the 5th, after that ominous sign, the slight preliminary hæmorrhage, a signal which often precedes disaster. (3) At operation actual ligation under local anæsthetic was sufficient. To continue and deal with the wound under pentothal, with the lowering of blood-pressure a general anæsthetic entails, was too severe a strain.

Case 2.—Private N. Battle casualty of 20.3.43. He had a large tense hæmatoma left thigh, in Scarpa's triangle, from a perforating shell wound, and a continual slight bleeding from one end of the tract in the anterior part of the left gluteal region, culminating in a brisk hæmorrhage 8 p.m. 15.4.43: General condition good. The external iliac artery and vein were ligated immediately under C_2 , E_3 anæsthesia; the wound itself was merely gently probed with the finger, some clots coming away. The patient made a good recovery, sitting up with healing wounds and normal circulation left leg, on evacuation 7.5.43.

Case 3.—Private B. Battle casualty of 6.4.43: a perforating shell wound left thigh. Continued elevated temp. and brisk hæmorrhage from both ends of the thigh wound tract on 25.4.43. Left external iliac artery and vein ligated under light C_2 , E_3 mixture. The hæmorrhage was controlled and the circulation satisfactory on evacuation 19.5.43. A blood culture on 13.5.43 had grown non-hæmolytic streptococci. A follow-up card from Major B. Williams, R.A.M.C., informed us that, in spite of repeated blood transfusion, first under Flight Lieutenant Blaxland at an R.A.F. Hospital, then under him, and drainage of a large osteomyelitic cavity in the left femur and a pyæmic abscess left elbow-joint on 23.6.43, this patient died on 24.7.43. Post-mortem showed a condition of liver and kidneys closely resembling amyloid disease.

All the three cases described showed, by the pallor and coolness of the affected limb for forty-eight hours, the initial spasm of the collateral circulation described when a main vessel is ligated in continuity; but after that period the circulation clinically equalled that in the sound limb. The impulses causing this spasm originate in the walls of the occluded main vessel travelling by way of the sympathetic system. This is the view of Griffiths (1930) in discussing the ætiology of Volkmann's contracture—a segmental spasm of the main artery being the occluding factor here instead of the surgical ligature. The most certain way of abolishing the reflex is to interrupt it at the source by resecting the segment of the main

artery in spasm, a procedure proposed originally by Leriche, or, in traumatic cases, by dividing the artery.

Colonel Donald, Consultant Surgeon, also stressed this point on a recent visit here. Division after tying in preference to ligation in continuity would seem advisable in future.

In these cases the external iliac artery and vein were ligated separately with stay knots of No. 2 catgut, *via* the extraperitoneal approach, as described by Miles and Wilkie (1936). Enlarged inguinal glands, in Case 2, and an aberrant deep circumflex iliac vein which passed behind the artery instead of in front, in Case 3, were snags encountered; and careful retraction was necessary to avoid damaging the important inferior epigastric artery. But this operation is not difficult and the collateral circulation following ligation of the external iliac artery, with the channels of the inferior epigastric, and deep circumflex arteries available at this level, is much better than when the common femoral artery is tied.

In Case 4, Captain C., ligation of the third part of the axillary artery was carried out on 10.9.43 for a gross shell wound of the right elbow of 8.9.43, which had torn through the brachial artery and ulnar nerve and broken the medial humeral condyle but left the median nerve intact.

In Case 5, Corporal W., the brachial artery was tied in the middle third of the arm on 10.9.43 for a severe grenade wound of 9.9.43 with profuse hæmorrhage from the torn radial vessels. In this case hæmorrhage had spread along the fascial plane in which the brachial artery lies, rendering the approach obscure.

In Case 6, Driver D., the hæmorrhage was moderate and controlled by opening the wound locally, cleansing and removing the metallic foreign body, and packing with vaseline gauze. These cases were all satisfactory on evacuation.

SEPSIS.

Two powerful agents have been added to the treatment of wounds in this war: (1) Sulphonamides; (2) Penicillin.

With the advent of sulphonamides a great deal of the graver pyogenic infections have undoubtedly been controlled. Only one of our battle casualties had a septicæmia (Case 3, Private B.). A favourable prognosis may even be given with staphylococcal septicæmia.

Case 7.—Gunner H. was admitted 2.10.43 very ill with a pimple on his nose which developed into a carbuncle. Gross œdema of both orbits and exophthalmus, left eye, developed; a blood culture on 2.10.43 grew a pure growth of *Staphylococcus aureus* and metastatic foci developed in the brain, with a left hemiplegia, in the pericardium, with signs of a local fibrinous pericarditis, and in the lung, with consolidation left base. Nevertheless, after 5 g. sulphonamide by mouth, 15 g. "Troseptale" (sulphapyridine) I.V., and 54 g. sulphadiazine I.V. and I.M. he recovered and, after a week's normal temp., was evacuated on 23.10.43 improving in every way. This case will be fully described elsewhere.

In spite of a full course of sulphonamides orally, however, a large number of wounds were heavily infected. Several cases with discharging wounds and pyrexia, coming in about the tenth day, who already had been given a course of sulphonamides, were given a second oral course with little effect. The influence of sulphonamides on established local sepsis appeared negligible.

The role of sulphonamides must not be overestimated. "The best safeguard against infection of a wound is early excision. Sulphonamides should not be used to give a false sense of security" (Paterson Ross, 1942). Their most useful function is prophylactic, tiding patients over till they reach a place where they can be dealt with surgically, and prolonging the time which may be allowed to elapse between wounding and surgical intervention (Debenham, 1943).

Chemotherapy cannot rectify heinous surgical errors such as suturing inadequately cleansed wounds.

Case 8.—Driver M., motor bike accident on 5.10.43. Sustained an extensive lacerated wound, front of right knee; this was stitched by an Italian doctor. Admitted on 7.10.43 with a grossly inflamed dirty wound. At operation, 7.10.43, pus found discharging from under

the iliotibial tract around an infraction of the lateral femoral condyle. Stitches removed, counter-incisions made. 15.10.43 : Temp. swinging 101° to 103° F. Operation : Pus found discharging from knee-joint. Counter-incision made on medial side, lig. patellæ, and vaseline gauze drain inserted transversely deep to lig. patella. 10 lb. wt. skin extension applied. 23.10.43 : Transferred. Still very ill. Here was a severe suppurative arthritis consequent on suturing a dirty wound. He had had a full course of sulphonamides orally (32 g.) starting from the first day.

Six selected cases were treated with penicillin powder supplied by Lieutenant-Colonel Fraser and sent on duly labelled, as he desired, for further investigation.

Case 26 Serjeant M. (shell wound chest + infected hæmothorax) and Case 11 Driver P. (shell wound perforating left thigh + gas gangrene) are described elsewhere. Case 4 Captain C. had his elbow wound dressed with 5 g. penicillin powder and is reported by Major G. Baines, R.A.M.C., to have practically healed (15.10.43).

Case 9.— C. Battle casualty of 8.9.43. Shell wound with traumatic amputation four fingers right hand. Operation 10.9.43. 2nd and 3rd fingers amputated through necks of metacarpals, 4th through metacarpophalangeal joint, 5th through middle of 1st phalanx. 5 g. penicillin powder and several loose S.W.G. stitches inserted. Captain H. Procter, R.A.M.C., reports that on 24.9.43 he "shows a linear scar over the distal ends of the metacarpal. Undoubtedly healing by first intention."

Two others, shell wounds—a compound fracture of ulna and a compound fracture of metacarpals—were afebrile and pain-free on evacuation a week after operation.

The clinical impression is formed that penicillin is a most potent agent in the treatment of wounds. If it can heal large wounds with a minimum of sepsis then it will greatly improve the chances in secondary suture of nerves, required in such patients as Case 4.

ANAEROBIC INFECTIONS.

Several cases of anaerobic infection have been treated.

Case 10.—2nd Lieutenant M. Battle casualty of 10.4.42. Aerial bomb wound right buttock and thigh. Treated first at a field ambulance. Admitted here 13.4.42. Operation 14.4.42. Some S.W.G. and catgut stitches and small rubber tube drain removed from an enormous wound of right buttock. Stinking dead muscle cut away and radiating incisions made. 33,000 units multivalent gas gangrene antitoxin given I.M. *Vibrio septique* and *B. sporogenes* grown freely from culture obtained at operation. Sank progressively with acute toxæmia, dying 16.4.42. Post-mortem report : "Very large wound of buttock and back of thigh. Typical malignant œdema and gas formation in all the muscles of the thigh. Cause of death, gas gangrene due to bomb wound." This was a very large wound massively infected with gas gangrene organisms from the anal canal one inch away. The patient arrived too late owing to Service conditions for radical early treatment of the wound. The danger of suturing and inadequate drainage of a wound in such a situation was shown only too well.

Case 11 illustrates the extraordinarily potent qualities of the new drug "penicillin." Driver P. Battle casualty 08.15 hours 8.9.43. Gunshot wound through and through posterior aspect left thigh in upper third. Bubbles of gas with a peculiar penetrating offensive odour noted on 10.9.43, crepitus detected on palpation around the wound tract and grave general symptoms of toxæmia present. 10.9.43, 23.30 hours, operation. Entry and exit wounds trimmed and prolonged downwards, each for 6 inches. Mid-line incision made 6 inches long down back of thigh. The wound passed through semitendinosus and biceps superficial to sciatic nerve. Whole tract stinking and bubbly. Tract widely excised and myomectomy of short head of biceps performed. The muscle removed was salmon pink in colour and did not bleed. 10 g. penicillin powder inserted ; 50,000 units antiga^s gangrene serum I.V., 40,000 units I.M. The swab taken at operation showed an encapsulated Gram-positive organism morphologically resembling *B. welchii*. Culture grew various anaerobic spore-boring organisms. 11.9.43 : 30,000 units A.G.G. serum I.M. 12.9.43 : Temp. normal. W.B.C.s 9,600. 30,000 units A.G.G. serum I.M. 15.9.43 : Wounds redressed under pentothal ; very clean. 10 g. penicillin powder inserted. Swab of wound on 15.9.43 sterile in both aerobic and anaerobic cultures. Condition excellent. 15.9.43 : Evacuated. Follow-up card sent.

Cases 12, 13 and 14 are examples of anaerobic infection existing in a wound without the case being "gas gangrene." Such an infection may be a dust borne contaminant, not a true pathogen.

Case 12.—Sapper M. Battle casualty of 10.8.43. Shell wound left leg, small, penetrating. X-ray 15.8.43 showed a small retained F.B. in the soft tissues of the calf near the middle of the posterior aspect of fibula. Some bubbles of gas with very offensive odour coming from wound; no surrounding crepitus and no symptoms. 16,000 units polyvalent gas gangrene antitoxin given. 18.8.43: Apyrexial throughout. Wound discharging thick pus now; painless. Culture from swab of 15.8.43: a large Gram-positive bacillus grown (no spores). Evacuated 20.8.43, healing well; had finished a course of 21 g. sulphapyridine.

Case 13.—Lance Corporal T. Battle casualty of 8.9.43. Shell wound right leg. X-ray 11.9.43 showed fractured fibula with foreign body lying against fracture in mid-third. Operation 11.9.43 Captain D. J. Brewer, R.A.M.C. Bubbles of gas and foul pus found coming from wound. Incision enlarged for 7 inches, metallic F.B. removed, tract widely trimmed. Sulphonamide vaseline gauze dressing. 80,000 units A.G.G. serum I.V. 12.9.43: 30,000 units A.G.G. I.M. 9 g. sulphadiazine given I.V. in 3 g. doses. 13.9.43: 3 g. sulphadiazine I.V., and 30,000 units A.G.G. serum I.M. Swab of wound; numerous gas forming organisms and hæmolytic streptococci. 15.9.43: Wound redressed; very satisfactory. Hæmolytic streptococci and *Staph. albus* in swab; no gas gangrene organisms. 17.9.43: Evacuated healing well. Had finished a course of 16 g. sulphathiazole by mouth.

Case 14.—Private R. Battle casualty, amputation through lower third right femur with two shell wounds further up thigh. 30.3.43: Redressed; swab taken of foul bubbly discharge from angles of amputation stump grew on culture anaerobes and sporing bacilli. No clinical symptoms or signs. 4.4.43: Redressed. Flaps satisfactory. Condition excellent. Evacuated.

In these cases bubbles of gas with a very offensive odour coming from the wound was an alarming sign demanding full investigation. But such cases, unless accompanied by symptoms, are not "gas gangrene."

Case 15 illustrates the condition of anaerobic streptococcal infection. Private G. Battle casualty of 7.4.43. Bomb wound perforating left buttock, right chest wall. Admitted 17.4.43. Entry and exit wounds in soft tissues of left buttock inflamed. Patient toxic with a greyish colour, T. 102°. 20,000 units antias gangrene serum given I.M. and sulphapyridine 1 g. 4-hourly by mouth. 22.4.43: Much better. T. 98°. W.B.C.s 8,600. Growth of anaerobic streptococci and Gram-positive bacilli obtained on culture from buttock wounds. 6.5.43: Healing well; apyrexial. Evacuated. Had 24 g. sulphapyridine by mouth.

Wide excision of the affected area and ample drainage; massive attacks with anti-serum, sulphonamides and penicillin powder locally seem the correct procedure in gas gangrene.

FOREIGN BODIES.

In a former campaign the criteria for removal of retained foreign bodies were when they were provoking pain, causing pressure on important structures or aggravating sepsis (Brown, Mason, Dennison, Ross and Divine, 1940). These indications held good in the present series. While it is not justifiable to hunt meticulously for foreign bodies in shocked patients with large wounds, every effort should be made to remove them if possible at the first "wound toilet" (the term used by Zachary Cope, 1942). A large number of our minor operations have been for removal of foreign bodies in wounds developing pain, elevation of temperature and purulent discharge after a period of quiescence during the first few days. Foreign bodies *in situ* act as a nidus of continued infection and reinfection in a wound tract. They press on nerves, cause secondary hæmorrhage, interfere with the function of a neighbouring joint or sphincter muscle, carry in anaerobic infection, jeopardize neighbouring amputation flaps. Mortar, shell, and aerial bomb fragments prove the worst offenders.

A few case histories illustrate these points; accurate X-ray localization was obtained preoperatively by utilizing the well-known "similar triangles method."

Case 16.—Serjeant K. Battle casualty of 5.8.43. Shell wound penetrating right thigh.

Some pain down distribution of sciatic nerve. X-ray showed presence of a large metallic F.B. 12.8.43 : Incision made over spot localized by X-ray. Piece of metal $\frac{3}{8}$ inch square found deep to semitendinosus with slight purulent accumulation around it. No stitches. Healed well. Discharged to unit in ten days.

Case 6 (also noted under Hæmorrhage). Driver D. Battle casualty of 7.12.41. G.S.W. left leg. Admitted 14.12.41 with moderately severe secondary hæmorrhage. X-ray showed no bony injury but a large retained foreign body. 14.12.41 : Operation. Stitches inserted by unit M.O. removed, clots and retained shrapnel fragment removed. Sulphanilamide powder and plaster case applied. Satisfactory on evacuation, 16.12.41.

Case 17.—Major A. Battle casualty of 10.8.43. 88 mm. shell wound left hip region, continual slight discharge from wound 3 inches below left greater trochanter and stiffness left hip. 14.10.43 : X-ray showed metallic F.B. overlying lateral surface left greater trochanter. Easily removed under pentothal 14.10.43. Wound healing well on discharge 20.10.43.

Case 18.—Private P. Accidental mortar shell wound 30.9.43, penetrating right cheek below lateral border of orbit with two retained foreign bodies in right lower eyelid near inner canthus. Both orbits œdematous, chemosis right eye, profuse purulent discharge from wound. 7.10.43 : Incision made in lower eyelid near inner canthus, two metallic F.B.s removed from orbicularis oculi. Two silk stitches inserted. Entry wound untouched. Evacuated healing well 11.10.43.

Small arms bullet wounds if perforating without damaging important structures (and amazingly, they often avoid these), make wound tracts that often heal without any trouble ; if penetrating, the retained bullet may also be symptomless.

Case 19.—Driver P. Sustained a wound on the top of the right shoulder lateral to acromion tip. No bony injury. X-ray showed a bullet intact, about .45 calibre, in antero-superior area right lobe of liver. W.B.C. count and sedimentation rate normal. Slight pain in right side of chest with full elevation of the arm considered due to fibrosis in the bullet tract. Relieved by physiotherapy and patient returned to duties.

The retained bullet, if accessible, should, however, be removed.

Case 20.—Trooper T. Admitted 20.1.42, following an accidental .38 revolver bullet wound two hours before. Entry wound just below lower end right femoral canal, traversing scrotum and upper part left thigh, with bullet coming to rest deep to iliotibial tract, posterolateral border upper third left thigh. No important structure damaged. Bullet easily removed through a small incision. Skin edges of entry wound trimmed. Uneventful recovery. Discharged healed to duties, 12.2.42.

Case 21.—Rifleman O'N. Battle casualty of 23.4.42. Machine gun bullet wound penetrating upper part right Scarpa's triangle. Healed uneventfully but now some pain in right groin. X-ray shows bullet intact above right pubic bone 3.8 cm. deep to skin. 15.9.43 : Incision in right groin under spinal anæsthetic. Right inguinal canal opened ; fascia transversalis incised and bullet found in extraperitoneal space of Retzius, right side, surrounded by some rusty fluid. Easily removed. Wound closed. Healing well on evacuation one week later.

IMMOBILIZATION.

The first principle in the treatment of any injury—rest—is denied the wounded man on the line of communication. Correct immobilization is the best substitute that can be supplied and can be best applied in wounds of the limbs. These constituted, as usual, the majority of our cases ; of 271 wounds in August and September, 1943, 147 were limb wounds. The work of many different surgeons, staged at this unit, afforded many lessons. Plaster of paris was the chief immobilizing agent used and the surgeon at a staging sector finds most of his work in attending to these plasters. In the desert most plasters travelled down extraordinarily well. A certain number required reinforcing or changing, having become loose, unstable, sodden, or broken in transit. Some required splitting. Almost every case where the plaster was unsplit complained of pain owing to swelling of the limb. This would seem an unnecessary statement but the significance of splitting plasters still requires stressing as the largest number of unsplit plasters were seen in the recent Sicilian campaign. Padded plasters though not so neat looking as unpadded are more comfortable on a journey. Padding helps

to absorb discharges ; skin tight plasters may dam back the drainage of pus and even thus lead to general disturbance, particularly in foot wounds.

We applied plaster cases also to flesh wounds if previously not immobilized. All such cases travel much more comfortably if fixed in light plasters. In 160 cases from the battle of 6.4.43, reaching us on 17.4.43, many plasters were swarming inside with maggots. The intolerable itching produced by these necessitated a new plaster. It was noted that, as usual, the wounds in these patients were beautifully clean,

Kramer wire splinting has a tendency to work loose and catch in the flexures of joints if not firmly enough bandaged on and if in too short lengths. It was seen to be most often used during the retreat of June, 1942, when speed in treatment was imperative.

Several cases of fractured femur passed through. Skeletal or strapping extension in Thomas splints was used in the cases of the November, 41, campaign. The difference in comfort of those men who had the splints firmly padded, especially at the ring, and those who had been badly put up, was very marked. More recently the incorporation of the limb and splint in the well-known Tobruk plaster has been seen, and these cases travelled better than their predecessors.

SPECIAL INJURIES : BURNS.

Burns can be classified as : (a) Extensive burns dangerous to life ; (b) burns, by reason of their position on joint flexures, eyelids, fingers, &c., dangerous to function.

Coagulation therapy, tannic acid or one of its modifications such as tannic acid—gentian violet—silver nitrate (Dennison 1939) was extensively employed in the early part of the war (Cohen, 1940 ; Ross and Hulbert, 1941). Certain drawbacks have discredited this method and the ideal treatment of burns has still to be found.

A series of 42 minor superficial burns coming into hospital within twelve hours was treated by either (1) gentian violet 1 per cent, tannic acid and silver nitrate 10 per cent, i.e. "immediate coagulation," or (2) saline and 1 : 1,000 flavine dressings, moist, four-hourly, in alternate cases. This experiment was clinical rather than accurately scientific as the exact measurements of the burnt areas were not checked. These superficial cases healed in an equal period of time with either method. The extent of the burnt area determined the rate of healing. The most important factor was the adequate preliminary cleansing gently with saline swabs and soap and water.

In burns over twelve hours old sulphonamide powder and tulle gras were used as the application of a coagulum to a burn twelve hours old and over was considered comparable to primary suture of a wound of the same period and correspondingly risky. Due regard was paid to the rapidity of absorption of sulphonamide from burnt areas, with its risk of over-dosage, and never more than 10 g. powder was applied. This is also stressed by Debenham (1943).

The method of enclosing the burnt limb in a plaster case over sulphonamide and tulle gras dressing was noted in several cases coming through us down the line and appeared satisfactory for patients bound for a long journey. It was noted (1) the plaster should be thick ; otherwise the copious exudate from the burnt surface soon made a thin plaster crumple up. (2) It should be split ; the œdema of a burnt limb makes an unsplit plaster very tight and painful. The silk envelope method, however suitable at a static centre, is not satisfactory on the L. of C. In the few cases we saw thus treated the envelope was stuck to the burnt area, dry and painful, requiring removal.

Coagulation is the logical treatment for minimizing fluid loss from burnt surfaces and tannic acid provides this factor. Unfortunately if sepsis occurs the tannic coagulum acts like a tight gauze plug in a wound and accelerates the spread of sepsis underneath. Most of the cases passing through us in the desert treated by tannic acid were grossly septic though whether some of the extensive ones would have survived by another line of treatment long enough to become infected is a debatable point.

Case 22.—Polish Officer Cadet S.T. Admitted 8.1.42. Accidental superficial burns of legs, buttocks, front and back of abdomen, both arms, face and neck. Cleansed with saline, and silver nitrate 10 per cent, tannic acid 10 per cent, and gentian violet 1 per cent applied under anæsthesia. Plasma given I.V. continuously for forty-eight hours. B.P. rose from 68/32 to 140/82 in eight hours, and remained satisfactory. Patient did well at first, then became difficult to control and had continuous pyrexia in spite of a full course of oral sulphamamide. Died on nineteenth day. Post-mortem showed fine central fatty degeneration of the liver. Heart dilated. Kidneys normal appearance. *B. pyocyaneus* and coliform bacilli cultured from under the tan. Death due to toxic myocarditis following extensive burns.

Case 23.—Staff Serjeant S. Admitted 6.1.42. Extensive superficial burns both buttocks and legs; tanned six days ago. Sank progressively and died in thirty-six hours. Post-mortem report: "Lungs: Numerous subpleural pyæmic abscesses and, in the substance of both lungs, there are small patches of bronchopneumonic consolidation. Liver: fatty degeneration and infiltration. Kidneys: a number of irregular pyæmic abscesses are found in the cortex. Heart dilated, pale myocardium. Bacteriology: (1) Culture from serum under the tan on burnt legs, *B. coli communis* and *B. pyocyaneus*. (2) Culture from kidney abscesses, *B. pyocyaneus*. Death due to pyæmia and toxæmia following extensive burns.

Such cases clearly illustrate the grave risk of sepsis under the tan. This risk renders the use of tannic acid unjustifiable on active service conditions if cases cannot be held. A tulle gras dressing is safer; though there is more fluid loss this can be compensated for largely by continuous glucose saline and plasma I.V.

BUTTOCK WOUNDS.

Buttock wounds should be treated with the greatest respect. Our experience amply confirms this well-known fact. Case 10 (gas gangrene) and Case 15 (anaerobic streptococcal infection) have been already described.

Case 24.—Private K. Singh. Admitted 4.12.41 with perforating wound of pelvis from side to side; battle casualty eight to ten days previously. Whole of lower abdominal wall sloughing with extravasation of urine. The patient had passed some urine *per urethram* for the first three days, then none. 4.12.41: Red rubber catheter passed *per urethram* and some concentrated urine was withdrawn. Suprapubic incision then made through the sloughing abdominal wall; space of Retzius found full of stinking purulent urine. Ragged hole in front of bladder seen below peritoneum. Malecot catheter inserted. Patient died six hours later. The bladder wound had been missed till too late.

Case 25.—Private P. Battle casualty of 8.9.43. Multiple shell wounds, admitted 10.9.43. Operation same day. Wound left buttock trimmed—it extended deeply into the left ischio-rectal fossa but no communication with the rectum was found. Wounds of both thighs trimmed; metallic F.B. removed right ankle region. Patient continued very toxic; ischio-rectal wound kept discharging gas and fluid fæces from the first. 17.9.43: Hb. 75 per cent, R.B.C.s 3,260,000, W.B.C.s 10,200. 18.9.43: Left inguinal colostomy. Loop of pelvic colon brought out and Paul's tube inserted. Proctoscopic exam. showed a small wound left side of rectum 4 inches up from anal orifice. Ischio-rectal wound then enlarged and flavine pack inserted. 19.9.43: 1 pint whole blood given. 30.9.43: Colostomy working well. Ischio-rectal wound much cleaner now. General condition excellent. Evacuated.

These cases demonstrate (1) the risk of gas gangrene in buttock wounds. (2) The importance of adequate drainage. (3) The ever present risk of grave visceral damage, not always obvious at first, but always to be suspected by (a) the direction of the wound tract; (b) the condition of the patient—much worse than can be accounted for at first examination of an apparently trivial wound and prompting further investigation.

CHEST INJURIES.

Several cases of wounds and crush injuries of the chest have been seen and the more serious evacuated to the chest centres. Most of these patients had been already dealt with and, on the whole, they travelled well. A strict observation had to be maintained, particularly in patients with hæmothorax, in case aspirations were required. It is as unjustifiable

for a forward surgeon to fail to aspirate a hæmothorax producing dyspnœa as it is for him to fail to split a tight limb plaster producing œdema and pain.

Case 26.—Serjeant McL. Battle casualty of 3.9.43. Large penetrating wound left pectoral region. Wound trimmed at F.S.U. 7.9.43: Signs of fluid at left base; 30 c.c. blood withdrawn at aspiration. 8.9.43: Admitted here, very ill, gross left hæmopneumothorax. X-ray 11.9.43 confirms clinical findings. Marked dyspnœa and slight hæmoptysis. 12.9.43: 46 oz. stale blood, very foul smelling, withdrawn from 9th left interspace, post-scapular line. Hb. 87 per cent. Seen by Major W. Nicholson, R.A.M.C. "Left infected hæmopneumothorax. Advise repeated aspiration and, when necessary, an intercostal drain." 13.9.43: 10 oz. further withdrawn. 15.9.43: Under local anæsthetic, self-retaining Malecot catheter inserted 8th left space, posterior scapular line. Report of organisms from aspirated material: Direct film, very numerous organisms, Gram-positive bacilli. Culture, staphylococci and many putrefactive anaerobes. 19.9.43 and 20.9.43: 10,000 units penicillin given intrapleurally in 100 c.c. saline. 22.9.43 and 23.9.43: 5,000 units penicillin given, i.e. 30,000 units in all. Direct film (a) twenty-four hours after first penicillin dose, a very great diminution in the number of organisms, (b) forty-eight hours after, organisms practically disappeared. 24.9.43: Re-X-rayed. Condition improved. Large F.B. (metallic) in left costo-diaphragmatic recess. Much less discharge from intercostal tube; purulent now and no longer blood stained. 27.9.43: Evacuated to chest centre. Here Major W. Nicholson took over and has supplied the follow-up details. "I did a rib resection on 29 September and removed the F.B. which was in the bottom of the pleural cavity. In spite of suction—at first effective—the lung has failed to expand due to a tiny bronchial fistula; I bronchoscoped him twice and sucked out the lung secretions. Now the fistula has healed and he is beginning to expand the left lower lobe. General condition very good. Will probably need a thoracoplasty in six months' time."

In crush injuries of the chest, a strict watch has to be maintained also. A condition may be developing which is the main cause of the progressing dyspnœa and general deterioration of the patient. This cause may be (1) hæmothorax or (2) tension pneumothorax, conditions rapidly amenable to treatment by aspiration of blood or air respectively.

Case 27.—A.B. W. Crushed by a raft when his ship was sunk by enemy action 9 p.m. 1.5.43. Admitted 2 p.m. 2.5.43. Very shocked. Left side of chest stove in; clinical fracture of 4, 5, 6, 7, 8 left ribs but no actual "paradoxical movements" detected as due to a segment of the chest wall becoming mobile (Tudor Edwards, 1943). Patient rapidly became unconscious; cardiac impulse detected 2 inches outside right nipple line. Physical signs of massive hæmothorax left side. Serum needle inserted into 6th left interspace post-axillary line and 1 pint blood withdrawn with 20 c.c. Record syringe, 5.30 p.m. 9 c.c. anacardone given at half-hourly intervals in 1 c.c. doses and 0.2 continuously. Patient recovered well, becoming conscious at 9 p.m. 5.5.43: Left lung re-expanded considerably and breath sounds heard over left upper lobe. 14.5.43: Marked pleuropericardial friction heard. X-ray showed left hæmothorax with fluid to level of rib 11. 16.5.43: 1 pint blood aspirated from left pleura. 19.5.43: Evacuated afebrile, in excellent condition. Extract from Major Logan's follow up report "25.5.43: Admitted to chest centre. Condition good. Left rib movements much diminished. Cardiac impulse in left nipple line. 5 oz. lightly blood-stained fluid aspirated below angle of left scapula, sterile on culture 26.5.43. 12.6.43: Left rib movements now just short of right. Vital capacity 2,000 c.c. 30.6.43: Rib movements equal, right and left. X-ray: left costophrenic sinus obliterated. Lung fields normal. 2.7.43: To Con. Depot twenty-eight days. Vital capacity, 2,500 c.c."

Case 28.—Corporal R. Admitted 4 p.m. 4.3.42, following crush between two railway carriages two hours before. At 11 p.m. became extremely collapsed, dyspnœic and with surgical emphysema, spreading up right side of neck and chest, and having slight hæmoptysis. Mediastinum displaced to left side and tympanitic note present on right side of chest. Diagnosis tension pneumothorax. Large bore serum needle inserted into second right intercostal space 3 inches from mid-line. Air escaped under great tension. Needle plugged and removed next day. 5.3.43: Much better. 16.3.43: Hæmoptysis ceased. X-ray shows expansion of right lung taking place. General condition very satisfactory. 19.3.43: Evacuated.

ALIMENTARY TRACT INJURIES.

Fifteen cases of injury of the alimentary tract have passed through ; they confirm the impression that such cases are the most unsatisfactory of all wounds to deal with. Wounds of the upper and lower ends of the tract stand the best chance as gastrostomy in œsophageal wounds and colostomy in rectal wounds divert the contents and give the best opportunity for healing in the affected areas.

Case 29.—Serjeant W., battle casualty of 8.9.43. Shell wound penetrating left side of neck low down anteriorly with formation of a hæmatoma. This was drained on 10.9.43 at another unit by enlarging the wound. 12.9.43 : Profuse discharge of œsophageal contents from the wound, at anterior border left sternomastoid at level of 1st thoracic vertebra, almost everything taken by mouth appearing there. Some surrounding inflammation. Condition deteriorating rapidly ; onset of mediastinitis considered imminent. Barium swallow showed almost complete hold up at the level of the wound. Attempts to pass a Ryle's tube unsuccessful. 13.9.43 : Senn's gastrostomy performed under 50 c.c. 2 per cent Novotux local anæsthetic. 20.9.43 : Patient greatly improved. Œsophageal wound closing in very well with practically no discharge. Gastrostomy functioning well.

Case 30.—Perforating wounds of the intestines have a well-deserved bad reputation, especially those in a transverse direction, owing to the large number of possible perforations in such a track (Jolly, 1940). One such case was Petty Officer R, accidental revolver bullet wound 16.10.43, who had seven perforations of his jejunum, one through the root of the mesentery and one through the ascending colon, found and sutured at operation. He never rallied and post-mortem showed in addition a tangential wound of the descending colon with extensive hæmorrhage in the retro-peritoneal tissues.

The shocked state of such patients, the ease with which small perforations may be missed, the difficulty in assessing the vitality of a loop whose blood supply has been damaged by a wound of the mesentery, the difficulty the small intestine has in re-establishing peristalsis in many cases along a segment, with sometimes only a small wound, all make these cases most disappointing.

Modern resuscitation, the use of continuous suction (*via* the Miller Abbott tube), the instillation of sulphadiazine solution into the wound, and the procedure of exteriorization of doubtful loops of intestine with colostomy, in large intestine wounds, offer a more hopeful outlook in the future.

Case 31.—Gunner P. Accidental shell wound 16.10.43. Penetrating wound, abdomen, and multiple flesh wounds including amputation left index finger at metacarpo-phalangeal joint. Operation seven hours after injury. Right subumbilical paramedian incision. General peritoneal cavity uninjured. Cæcum and ascending colon found full of blood with hole in ascending colon, 2 inches up, on lateral side, deep to a perforating wound through right iliac crest. Large mass of blood clots removed. Rutherford Morison muscle-cutting incision made in right iliac fossa and ascending colon brought out as a colostomy with rubber tube in the perforation. Continuous glucose saline and plasma I.V., with soluble sulphanilamide and sulphadiazine I.V., and continuous gastric suction. 23.10.43 : General condition still poor but colostomy working well and patient taking fluids by mouth on transfer to another unit.

SUMMARY.

(1) In a series of 2,316 cases of battle and accidental trauma, certain points have been selected for review illustrated by thirty-one brief case histories.

(2) The importance of general treatment and resuscitation is stressed.

(3) Operative procedures in three cases of secondary hæmorrhage of the thigh are described and the extraperitoneal ligature of the external iliac vessels advocated.

(4) The false sense of security given by sulphonamides without thorough wound toilet is condemned.

(5) Highly gratifying results in six cases treated with penicillin powder are recorded.

(6) Six cases of anaerobic infection of wounds are described, including (a) two cases of

gas gangrene; (b) three cases of symptomless anaerobic infection; (c) one case of anaerobic streptococcal infection.

(7) The pros and cons of removing retained projectile fragments are weighed up.

(8) Treatment of burns is discussed, including a series of forty-two cases treated by alternate methods of coagulants and non-coagulants. The risk of pus collecting under tannic acid coagula is stressed.

(9) Two cases are described illustrating the well-known danger of visceral damage in buttock wounds. A danger signal in such patients is pointed out—the general condition being much graver than can be accounted for at first sight by the apparently trivial nature of the surface wound.

(10) Two causes of severe dyspnoea in chest injuries, (a) hæmothorax, (b) tension pneumothorax, are mentioned and their management described.

(11) The value is emphasized of: (a) Gastrostomy in œsophageal wounds; (b) colostomy in rectal wounds; (c) exteriorization of the affected area in wounds of the large intestine.

I am indebted to Major J. E. Craik, R.A.M.C., Pathologist, for the post-mortem notes and laboratory reports in this review. I am also indebted to him for his co-operation in the management of all serious cases.

REFERENCES.

- BROWN, J. J., MASON, DENNISON, W. M., ROSS, J. A., and DIVINE, D. (1940). *Lancet*, **2**, 443.
 COHEN, S. M. (1940). *Brit. Med. Journ.*, **2**, 251.
 COPE, V. ZACHARY (1942). *Ibid.*, **1**, 648.
 DEBENHAM, R. K. (1943). *Ibid.*, **2**, 223.
 DENNISON, W. M. (1939). *Lancet*, **2**, 1,107.
 GRIFFITHS, — (1930). *Brit. Journ. Surg.*, **18**, 188, quoted by *Brit. Med. Journ. leader* (1943), **1**, 108.
 JOLLY, D. W. (1940). "Field Surgery in Total War," London.
 MILES, A., and WILKIE, D. P. D. (1936). "Operative Surgery," London.
 ROSS, J. A., and HULBERT, K. F. (1941). *Brit. Med. Journ.*, **1**, 618.
 ROSS, J. PATERSON (1942). *Ibid.*, **1**, 589.
 TUDOR EDWARDS, A. (1943). *Brit. Journ. Surg.*, **31**, 74.

of heat and a stage of sweating, followed by a period of normal temperature, known as the interval, the attack lasting six to ten hours in all.

Practitioners in malarious districts often see cases of benign tertian malaria which do not conform to the above description. The following cases are examples of such aberrant clinical pictures :—

Case 1.—S. W. was admitted to hospital on 8.9.43 complaining of fever, headache and general malaise, beginning gradually two days before admission. No previous history of malaria.

On examination : Temp. 102.4° F. Pulse 80.

Chest : Heart normal, lungs clear.

Gastro-intestinal system : Tongue furred, appetite poor, bowels regular, liver and spleen normal, no pain or tenderness.

The fever remained continuous (see Chart I).

Blood smears on the first and second days were negative.

11.9.43: W.B.C. 3,250, polymorphs 33 per cent, lymphocytes 55 per cent, monocytes 12 per cent.

The clinical picture was very suggestive of enteric fever.

On 12.9.43 the spleen was palpable one finger, a phenomenon which is not found so early in enteric fever, especially in mild cases. Blood smears showed *P. vivax*.

On receiving anti-malarial treatment the patient made a rapid uneventful recovery.

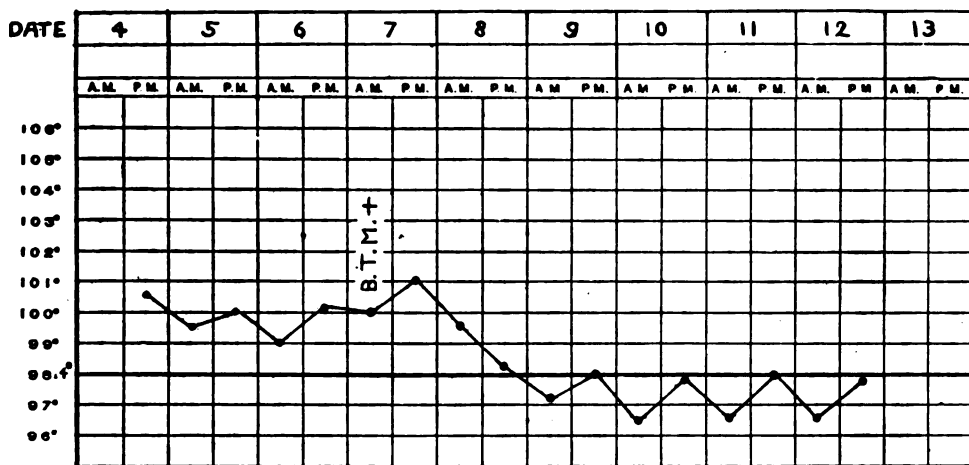


CHART II.

Case 2.—S. A. This patient was transferred from another hospital on 4.9.42.

Past History.—Patient had an attack of malaria in 1935, headache and nervous fits in 1936.

He joined the Army somewhere in Africa on 13.9.40.

In 1940 the patient had gonorrhoea and, in 1941, he suffered from bronchitis for two months. In June, 1942, he complained of pains in joints and was treated in hospital where he remained twenty-six days.

Present History.—One week after being discharged from the hospital the patient began to complain of joint pains and backache; the pains became so severe that he was sent to another hospital on 31.8.42 with the diagnosis "rheumatisme chronique." On 4.9.42 he was transferred to this hospital.

On admission, he was complaining of fever, headache, pains in both hips, knees and ankles. Temp. 100.2° F. Pulse 88.

Chest : Heart and lungs—no abnormality detected.

Abdomen : Liver and spleen both enlarged and tender. Examination of joints showed pain and tenderness in both hips, knees and ankles, especially on movement.

Progress.—Neither the joint pains nor the fever improved under treatment with sodium salicylate (see Chart II).

Owing to the enlargement of liver and spleen and the previous history of malaria blood smears were taken on 7.9.42 and showed *P. vivax*. The condition improved promptly under anti-malarial treatment. Blood Kahn test and W.R. + + + +. Antisyphilitic treatment cleared the residual symptoms of headache.

Case 3.—The following case shows how malaria can complicate, or be complicated by, other disease. If it is not suspected and treated the patient's condition will deteriorate.

H. W. was admitted on 16.8.43 complaining of pain and tenderness, right hypochondrium, with fever, headache and poor appetite, which had begun suddenly the day before.

Past History.—Patient had had amœbic dysentery in December, 1942, and March, 1943, when he developed liver abscess, which was aspirated.

On examination: Temp. 102° F. Pulse 106.

Chest: Heart normal; lungs, diffuse rhonchi both sides.

Gastro-intestinal system: Tongue coated, appetite poor, bowels regular—once daily, semi-solid stools. Teeth fair, spleen palpable, liver enlarged two fingers and very tender; slight tenderness both iliac fossæ, especially the right.

Investigations.—W.B.C. (on admission) 10,750; polymorphs 64 per cent, lymphocytes 29 per cent, eosinophils, 2 per cent, basophils 1 per cent, monocytes 4 per cent.

Stool examinations (serial)—vegetative forms of *E. histolytica* present on 19.8.43 after four injections of emetine gr. i each.

Progress: Patient had shown some improvement, but on 19.8.43 his condition became worse, in spite of amelioration of the hepatitis (see Chart III).

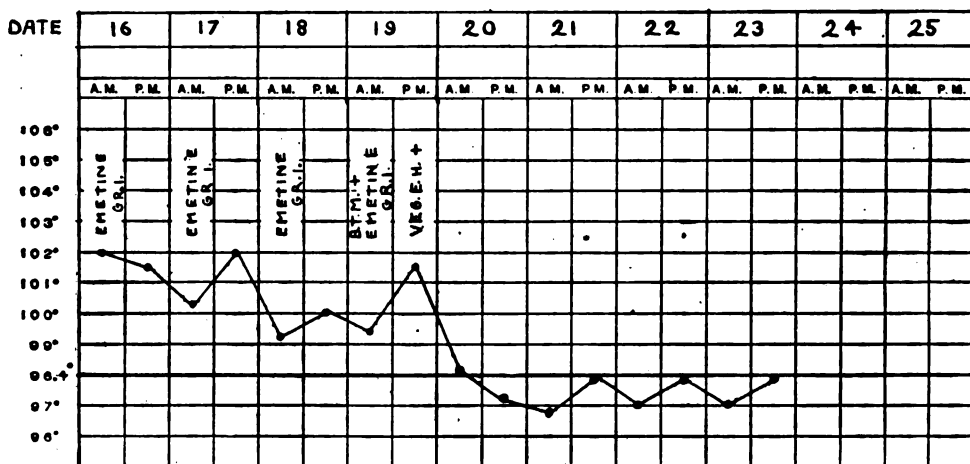


CHART III.

W.B.C. (19.8.43) 3,300; polymorphs 45 per cent, lymphocytes 45 per cent, monocytes 10 per cent.

The film showed scanty gametocytes and trophozoites of *P. vivax*.

Anti-malarial treatment was combined with anti-dysenteric treatment and the patient made an uneventful recovery from the acute attack; but, owing to residual enlargement and tenderness of the liver, it was thought advisable to evacuate him to the United Kingdom.

This patient had had no previous attack of malaria. In this case, if malaria had not been detected the condition would have deteriorated and similar cases are not uncommon.

Case 4.—The following case shows how an irregular relapsing type of fever responded to anti-malarial treatment.

P. M. was admitted on 19.7.43 complaining of fever, headache and general malaise of two days' duration.

Past History.—The patient had a history of three previous attacks of fever, the last attack in South Africa three months ago. He said that cold water did not suit him and that he got a mild shivering attack every time he had a cold bath.

On examination: Temp. 100.2° F. Pulse 80.

Chest: Heart and lungs normal.

Abdomen : Spleen palpable two fingers, liver slightly tender, otherwise nil of note.

Investigations and Progress.—Blood culture, count and urine culture were negative. The fever ran an irregular course (see Chart IV).

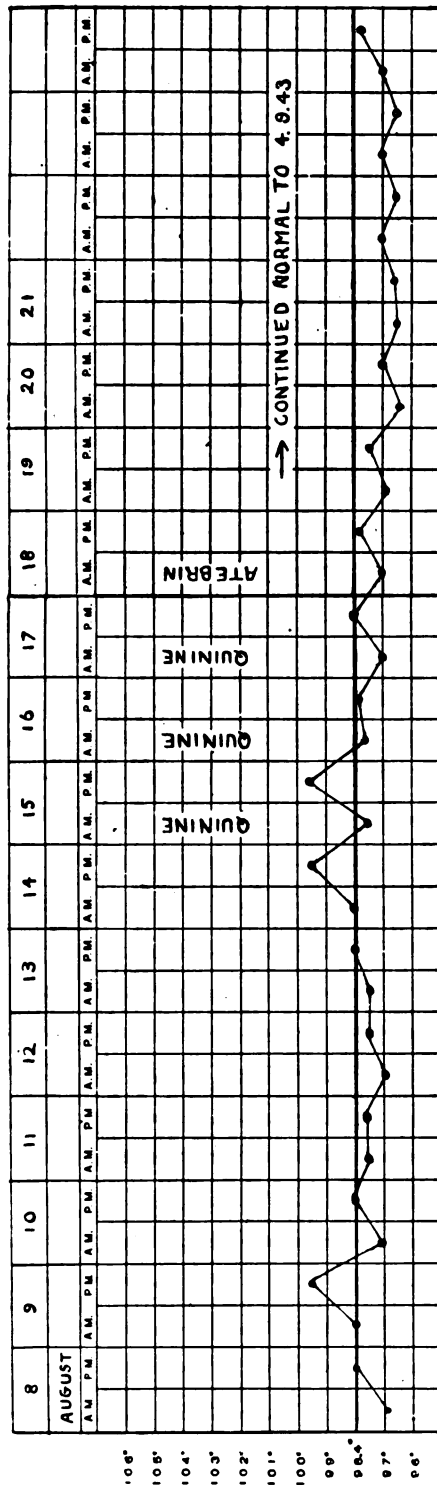


CHART IV.

Blood was repeatedly examined for malaria, once after provocative adrenalin, and was found negative. This test consists in giving m xv adrenalin intramuscularly and examination of blood after 5, 10, 20 and 30 minutes.

Owing to the enlargement of the spleen, residence in malarial district and previous history of fever, an anti-malarial course of treatment was given. The temperature dropped, spleen decreased in size and the patient was discharged on 4.9.43 after twenty days normal temperature. He said that he had never felt so well before.

Case 5.—D. V., Yugoslav, aged 32, was admitted to hospital on 25.5.43 complaining of headache, dizziness, aches in the limbs, constipation and poor appetite, without any fever.

On examination: Muddy complexion. Temp. 98°F . Pulse 64.

Chest: Heart normal; lungs, decreased air entry back and front of right side.

Abdomen: Spleen palpable, otherwise nil of note.

Investigations and Progress.—Blood hæmoglobin 100 per cent; R.B.C. normal; W.B.C. 6,000; Polymorphs 68 per cent; B.S.R. 40 mm./1 hour. Kahn test negative. Blood smears taken at three-hourly intervals negative for malaria. On 4.6.43 blood smears were taken after provocative adrenalin injection and scanty trophozoites of *P. vivax* were present in the blood smears taken five and twenty minutes after the injection. Anti-malarial treatment was given with much improvement of his symptoms.

This case was under the care of Major J. W. Crofton, R.A.M.C., who has kindly allowed me to quote it. It shows how B.T. malaria may simulate dyspepsia or anxiety state and may run the whole course without pyrexia.

TREATMENT.

The standard course of treatment in the Middle East is as follows:—

(1) Quinine gr. x t.d.s. for three days. In cases which do not respond quickly it is advisable to give four days' treatment with quinine.

(2) Mepacrine (Atebrin-Bayer equivalent) 0.10 g. t.d.s. for five days.

(3) Rest for three days.

(4) Pamaquin (Plasmoquine-Bayer equivalent) 0.01 g. t.d.s. for three days or twice daily for five days.

Alkalines are given in sufficient doses to keep the urine alkaline during pamaquin treatment.

Under this treatment complications rarely occur.

In treating malignant malaria there is a tendency to immediate use of intravenous quinine which is rather against the old teaching.

The following routine can be a guide in the treatment of M.T. malaria:—

(1) In cases where there is no vomiting and the patient is conscious the above course is sufficient to control the disease.

(2) Where there is vomiting or heavy blood infection, i.e. more than six parasites per thin field of a blood slide, even in the absence of a severe clinical attack of malaria or where it is known that a pernicious type of M.T. malaria is prevailing, the treatment should begin with one or two intramuscular injections (at intervals of twelve hours) of 8 to 10 gr. quinine during the first day. If given with care in the upper lateral quadrangle of the gluteal region these cause no harm. The course of treatment should continue as above.

(3) Intravenous quinine should be used sparingly as it has the following disadvantages: (a) It depresses the circulation and it lowers the B.P. in a previously severely shocked patient. Therefore it is always advisable to give it with adrenalin m x of 1:1,000 solution intramuscularly or, in very severe cases, intravenously. (When injected intravenously adrenalin should be given very slowly.) (b) Rapidity of its action causes rapid destruction of many parasites and the toxic products of their disintegration cause a reaction, similar to Herxheimer's in syphilis, which may cause immediate death.

In my opinion and experience the best method of giving intravenous quinine is in 25 to 50 per cent glucose solution, 8 to 10 gr. in 20 c.c. This is especially indicated in cerebral cases where there is œdema of the brain.

(4) In very severe cases, where many blood corpuscles are infected, blood transfusion is indicated from the beginning as well as other general modes of resuscitation.

(5) It is advisable in cases where there is involvement of the myocardium to start treatment with preliminary intramuscular injection of quinine gr. x and to follow it up six to eight hours later by an intravenous injection of gr. v.

DISCUSSION.

The protean symptomatology of malignant malaria is well known but the variation in the clinical picture of B.T. malaria is not much appreciated.

The above cases, however, show that B.T. malaria does not always present the classical picture of the malarial stages.

Moreover, it must be remembered that the clinical picture may be mixed with that of another disease, e.g. amœbiasis, typhoid fever, hyperpyrexia, rheumatism, anæmia, pneumonia or septic infection. Any factor lowering the resistance of the body, e.g. chill or operation, may flare up an old malarial infection.

The blood examination is not always positive, even after repeated or provocative tests, as in Case 4. The most important points in cases of prolonged irregular fevers due to malaria are the following :—

- (1) The spleen is almost always enlarged and rather hard ; not soft as in septicæmias.
- (2) Malarial fever begins to rise late in the morning or early in the afternoon.
- (3) The patient is not so toxic as in septicæmic or pyæmic states.

SUMMARY.

From the above, we can summarize the following facts :—

- (1) B.T. malaria often does not conform to textbook description of being a fever consisting of alternating regularly recurrent paroxysms.
- (2) In all irregular fevers, with enlargement of the spleen and negative findings, it is worth while trying anti-malarial treatment which is especially indicated (a) if the patient has been in a malarial district, (b) if there is a past history of malaria.
- (3) If a known disease is diagnosed and does not respond to ordinary treatment, malaria as a complication should be thought of, especially (a) if the patient has been living in a malarious district, (b) if the spleen is enlarged, (c) if there is variation in the symptoms from day to day ; and, if there is periodicity in the variation of symptoms, then it is almost certain that malaria is complicating the disease.
- (4) If the case does not show definite improvement after giving quinine gr. x t.d.s. for two days, when the temperature should be within normal limits, anti-malarial treatment should be stopped and the diagnosis should be reviewed.
- (5) Patients from the tropics are often infected with more than one disease : malaria, syphilis, various parasites, etc. (Case 2).
- (6) A summary of the treatment of malaria has been outlined.

In conclusion, I have to thank Lieutenant-Colonel J. C. Scadding for his kind help and encouragement.

REFERENCES.

"Manson's Tropical Diseases." Eleventh edition : Section I : Chapter III.
Army Medical Department Bulletins.

Editorial.

D.D.T.

MANY advances in the prevention and cure of disease have been made during the last few years through the discovery of the drugs whose names are now household words—Atebrin, Prontosil and Penicillin. Another remarkable advance, which may have a far-reaching effect in saving manpower by the prevention of disease, particularly in tropical climates, is about to be made by the employment in various ways of a synthetic chemical whose existence has been known for many years but whose enormous powers have only lately been fully appreciated. This chemical is known as "D.D.T."

D.D.T. stands for p,p-dichloro-diphenyl 1-2-3 trichloro-ethane and in its crude form is a white crystalline powder.

It was first discovered in 1874 but, like so many other useful discoveries, it was allowed to lie dormant until 1939 when the Geigy Company, of Switzerland, found that it was an excellent insecticide against moths and bed bugs. Later, as an experiment, it was tried against a plague of potato beetles and the results were markedly successful.

Until 1942 we depended for our insecticides mainly on pyrethrum, which was produced almost entirely in East Africa and Japan, and on derris root, the sole producing country of which was the Dutch East Indies. With the entry of Japan into the war we lost almost our entire supply of derris and at least half of our supplies of pyrethrum. The amount of pyrethrum produced in East Africa was barely enough to supply the fighting Services of the Allies and left no margin for use for agricultural purposes and for the preservation of stored food.

In 1942 the British Military Attaché at Geneva called the attention of our Government to D.D.T. and research into the possibilities of this chemical as an insecticide was immediately begun. After intensive work it was very soon found that D.D.T., in the laboratory at any rate, seemed to be the most efficient insecticide yet produced.

The American and Dominion Governments were at once informed and, at the present time, a large body of scientists is engaged in testing this new chemical and inquiring into its potentialities for wider use. At present its possibilities seem almost unbounded.

By 1943 we had satisfied ourselves in the laboratory that D.D.T. was all that it had been claimed to be but we still had to find out its effects in the field.

Luckily or unluckily the opportunity to test it was presented to us at the end of 1943 in Naples.

Naples provided a most urgent problem; typhus fever had broken out in a city of some half a million souls with all its sanitation disrupted, no civil sanitary service to deal with epidemics, and a large Allied Army closely associated with the inhabitants, who were desperately poor, dependant and many of them starving and living in overcrowded conditions in air-raid shelters. The stage seemed set for a pandemic of typhus fever.

As it was evident that typhus was becoming a danger to both the Army and the civil population, strong measures were immediately taken by the medical authorities on the spot. Speed in dealing with the louse-infested population was essential and it was decided to use anti-louse powder on a large scale.

The anti-louse powders available were the earlier type A.L. 63 containing Rotenone (the active principle of derris and lonchocarpus) and M.Y.L. (containing pyrethrins). It was only later that anti-louse powder containing D.D.T. became available.

These older powders had in effect already checked the epidemic before D.D.T. was used, but the great advantage of D.D.T. was the longer residual effect it possessed, killing off successive generations of lice as they hatched out.

The method employed was to dust each individual with anti-lice powder, using an agricultural type of dusting gun, and in this way over a million people were treated.

All troops in the vicinity were inoculated against typhus fever and, amongst other factors which had an important bearing on the suppression of the outbreak were:—(a) Systematic search for cases; (b) the power to compel the civil population to submit to dusting; (c) the ease of dusting, which enabled teams to visit outlying districts and towns and even air-raid shelters where the process could be carried out quickly and efficaciously on the spot.

By the end of January, 1944, the epidemic was broken.

During the last war anti-lice powder was a standard issue to the British soldier but the new method of application by large-scale dusting instead of individual application of the powder is the novel feature, while the modern anti-lice powders are much more effective than the old last-war N.C.I.

While the Naples outbreak proved the efficacy of D.D.T. against lice, laboratory and field experiments both in Great Britain and the U.S.A. had extended our knowledge of its action against other pests.

For example, against flies, both adults and larvæ, it was found that control was comparatively simple.

However, its greatest use, and where it promises to revolutionize insect control, is against the mosquito.

One of the most important methods of using D.D.T. is as a residual spray in kerosene. Such a spray is applied to the walls of dwelling houses, tents, etc., and, after the evaporation of the kerosene, the minute crystals of D.D.T. left on the surface remain lethal to insect life for as long as 100 days.

It is equally effective against adults and larvæ and as a spray D.D.T. can effect 100 per cent kill though its knockdown time is slow. Against the mosquito it is probably best used as a spray, either by hand, by power compressor, or even by spraying from aeroplane, and in each case, after exercising its direct effect, it remains as a residual killer.

Bed bugs have been eradicated by applications of 5 per cent D.D.T. spray in kerosene to beds and mattresses and the cracks and crevices of walls. A single thorough application with an ordinary hand-sprayer has given complete freedom for as long as nine months. While liquid sprays are the best method of combating this pest, a certain amount of protection can be obtained from the D.D.T. louse powder.

Against cockroaches, D.D.T. has given good results and, as a wartime method of control, its use against the mites responsible for scrub typhus promises well.

There is reason to believe that the incidence of scabies is considerably lessened by the addition of a small quantity of D.D.T. to the various ointments and lotions employed.

To the foregoing account of the development of D.D.T. as an adjunct to Military Hygiene in terms of manpower saving must be added the wide possibilities opened up by its potential use for agricultural purposes and in the destruction of insects preying on stored food.

At present it is in short supply. All available production is being allocated to the Services. When supplies improve, or when the war ends, civilians will share the benefit of this powerful insecticide and its uses will no doubt be widely extended.

Much has yet to be learned, and many more tests have to be carried out, before the limitations of this insecticide have been revealed but, so far as we have gone at present, its limitations are not even in sight.

Is it safe to get rid of all pests? If we upset Nature's balance will the history of pest extermination be repeated? Only time can say. But to our Armies fighting in the Far East it would appear that we can promise greater freedom from disease, and in particular malaria, than we have ever been able to offer before.

Clinical and Other Notes.

MEDICAL SERVICES FOR PRISONERS OF WAR IN THE MIDDLE EAST.

BY COLONEL J. R. McDONALD, M.C., T.D.

THE captive's lot is not a happy one. The story of his fate and fortune down the ages would form an interesting strand of history. Never before in the annals of war have the numbers approached those in the present conflict—incidentally, perhaps, the most redeeming feature of modern warfare. As a consequence, the department whose duty it is to collect, provide for, treat and dispose of them has no small task. The Medical Services play an important part in this organization.

The following is an account of those services in the Middle East, viewed from the standpoint of the Base Hospital, which, since the earliest campaigns, has been the principal P.O.W. Hospital.

It is a desert hospital, in appearance like a small township, with 1,200 British and 1,000 P.O.W. beds. Built in 1941, it comprises no less than 138 separate buildings and 130 tents of various kinds. The standard ward takes 24 beds and they are arranged in pairs with an intervening annexe. The tented wards are Hospital Extending Marquees with five sections, cement floors and surrounding walls breast high. The water supply is ample, of excellent quality and each annexe has shower baths. Electricity is installed throughout and most wards have fans and refrigerators. By means of four central steam boilers and calorifiers outside the wards, hot water is available on tap in every building of the hospital. Medical and R.A.S.C. supplies are excellent and the Contractor delivers vegetables and perishable goods every day. Daily consumption includes 2,200 eggs and 160 gallons of milk.

The P.O.W. Section shares these amenities and supplies equally with the British Section. It is mainly tented, only ten of their forty-two wards being huttred. Except during extreme heat, however, tents are in many ways preferable. The section is self-contained except that the Operating Theatres and X-ray Department are within the British Section and are used by both.

In the early days both Germans and Italians were admitted, the staff being Italian. In the summer of 1942, the Germans, being a minority, were moved to another hospital. Five months later, in consequence of a change of policy, it became in turn the German Hospital. Nearby there are two large P.O.W. Camps with whom we co-operate closely.

The question of security is the only novel aspect in administration. While the Italians were here, the measures adopted were largely "token." For the Germans, the usual double fence with sentries and lights has been provided.

With the close of the African campaign a chapter has ended and a few facts and impressions seem worthy of record.

The staffing of the hospital was the chief preoccupation in the preliminary stage. On October 22, 38 patients were transferred from the other hospital and with them came two Officers and 92 Other Ranks, a satisfactory nucleus. The battle of El Alamein had begun and by November 30, the occupied bed state had jumped to 933, mostly severe battle casualties. It should be mentioned that each P.O.W. Camp has its own hospital and that only the more serious cases are admitted here. The establishment was very quickly increased to 13 Officers and 210 Other Ranks, at which figure it has remained. Care was taken in the selection of Medical Officers. Their conduct and attitude had to be strictly professional. Any who showed signs of disregarding this rule were immediately replaced. On the other hand it was necessary to produce a working team and avowed anti-Nazis were obviously misfits.

The running of the hospital has been left largely to the prisoners themselves. As regards equipment they have the normal British Scale. Through the Swedish Legation and International Red Cross they obtain supplies corresponding to those we get from the British Red Cross. Organized on Divisional lines, their methods are little different from ours. The absence of Sisters accounts for the lack of that humanizing influence so markedly present in British Hospitals.

The whole-time British Staff consists of one W.O., 4 N.C.O.s and one Private, all engaged in clerical or Q.M. Departments. The services of our Specialists are available when required and in case of need the full resources of the British Hospital are placed at their disposal.

A weekly inspection is carried out by the O's i/c Divisions and myself. The interest of these inspections is twofold, psychological and clinical.

The average physique of the Africa Korps is good though quite a number are lads under 21. Their hospital discipline is strict. One's progress on these inspections is punctuated with "Achtung" at every turn. The patients lie to attention in bed, all eyes riveted on the inspecting officer throughout his tour of the ward. Their Medical Officers salute all patients of a higher rank than themselves. The wards and surrounds are well kept but they have not the artistic sense of the Italians. Nor have we. Generally speaking, they appear a dull crowd. There is a sameness of expression and feature and little of the saving grace of humour.

The main thing to find out is what they are thinking and saying amongst themselves. This is not easy but tell-tale straws are not lacking. Some we know as strong party men. They are the dominant personalities. But that there is acute dissension amongst themselves there is not the slightest doubt. From the neighbouring camps cases are occasionally admitted, men who have been severely beaten up by their colleagues. They are admitted to the British Hospital.

They have frequent sing-songs in the evenings. Every defeat seems to be a signal for excessive boisterousness. To many of them, one imagines, this must have a hollow sound.

A revealing light on their mentality recently emerged. Excellent bathing is available two miles away. Permission was obtained for their Officers to avail themselves of this, once a week, provided they signed a statement that they would refrain from any sabotage or subversive activity. The Medical Officers, although they can move about at will in the British Hospital, refused to take advantage of this privilege. The methods of the Gestapo extend even into P.O.W. Hospitals!

So far as skill and competency of the Medical Officers are concerned it would be unfair to generalize. Most of them are young, recently qualified, intense, with a narrow outlook. The senior surgeon and physician are men of experience, of a calibre equivalent to that of an O. i/c Division.

The Hospital opened with a bang in November when we received convoys direct from the forward areas at El Alamein. Indeed at one time it had to overflow into the British Section. During the first few weeks it was almost entirely surgical. Later, battle casualties were transfers from other hospitals where urgent treatment had been carried out. The total number of surgical admissions from October, 1942, to June, 1943, was 1,100. Not all are battle casualties. Many are normal surgical cases from the local Camps. But as regards the volume of work involved this figure is not comparable with a similar number of admissions to the British Hospital—for two reasons. Firstly, only severe cases are sent here and secondly, for the Germans, there has so far been no invaliding or further evacuation.

A brief analysis gives some idea of the nature of the cases.

Amputations performed in forward areas, including 45 through the thigh ..	114
Total number of fractures, including 79 Femurs, 43 Humeri	413
Number of operations	622
Plasters applied	654
Deaths	13

A large number of these were amongst the early admissions. This hospital has retained all serious and chronic cases. Circumstances have provided the opportunity for continuous observation of these battle casualties over a period of eight months and from the date of

primary treatment—a rare occurrence in Army medicine. Cases requiring special treatment are sent to the British Centres, e.g. Facio-Maxillary, Plastic, etc.

Many dramatic stories could be told. A German airman, shot down into the sea off Malta, was rescued by a British Destroyer. He was admitted to Hospital on the Island with G.S.W. abdomen. Eight tears of the small bowel were sutured, one a rent involving three-quarters of the circumference of the gut. He arrived here practically convalescent within a month of his wounding.

Less dramatic but more significant is the record of the Medical Division in the early weeks.

The total number of medical admissions during the eight months period was 1,850. These included 770 dysentery, 95 enteric group, and 70 cases of pellagra and other deficiency diseases.

The dysenteries and typhoids constituted a serious problem in November and December. During these months 276 cases of chronic bacillary dysentery were admitted. Many had had chronic diarrhoea for several months in the German forward areas. Some had protein deficiency oedema their serum protein levels being subnormal. Four dysentery cases died. The spectacle these cases presented was even worse than the severe battle casualties—men reduced to scarecrows because their medical services had failed to cope with the dysentery problem. The high incidence of pellagra was the result of failure of absorption due to prolonged diarrhoea.

In addition to the deaths from dysentery there have been on the medical side eight others, five being due to typhoid.

The German Medical Officers deserve well of their country. Their attitude has been courteous and correct and co-operation in medical matters has been cordial.

The Geneva Convention is the sole surviving plank of international morality. Across it some day a bridgehead to normal relations may be established. This article has been written to confirm that on the British side it has been sustained and observed in the letter and the spirit.

STRETCHER PHYSICAL TRAINING.

BY CAPTAIN G. J. G. KEYS,

Royal Army Medical Corps.

STRETCHER Physical Training is designed to develop the muscles used in carrying wounded men and in the equally arduous task of loading and unloading ambulances.

The most strenuous physical work in a Field Ambulance still devolves upon the stretcher-bearer and it was with a view to increasing the endurance of stretcher-bearers and lengthening the time that they could work without undue fatigue that this series of exercises was evolved.

ADVANTAGES.

- (1) No equipment needed except that carried by the unit.
- (2) Any piece of ground large enough to contain the squad is suitable.
- (3) Can easily be performed in ordinary working clothes.
- (4) Physical Training is applied to the actual work men will be called upon to do

GENERAL PRINCIPLE.

Each exercise is designed to develop muscles used in a particular act of carrying or lifting. Each exercise is followed by a stretching exercise as a counteraction to the weight-lifting.

I would like to express my thanks to Staff Serjeant Sale, R.A.M.C. for his assistance in arranging this series of exercises and to Private Chinn, R.A.M.C., for his drawings in the original.

To prepare squad for Stretcher Physical Training :—

"Tallest on the right, shortest on the left, in single rank—fall in!"

(While sizing, ensure that short strong men are placed above those who are slightly taller but obviously not so muscular.)

"In threes—number." "Right turn." "Ones to front rank; twos to centre rank; threes to rear rank. No. 1 stand fast, remainder—Quick march."

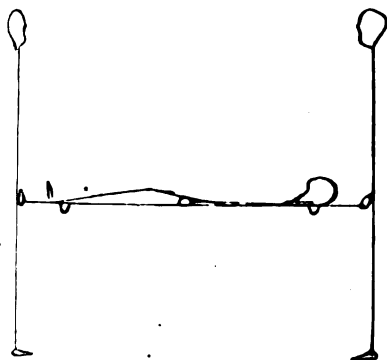
"Squad—Left Turn."

"Ones and threes—fetch stretchers—Move."

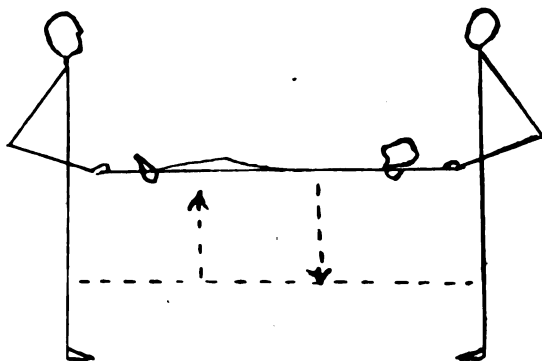
Nos. 1 and 3 double to stretchers, bring them back, and place them on left of their No. 2. Then fall in on right of their stretcher.

EXERCISE I.

POSITION



EXERCISE



1st "patient" is No. 2, who lies on the stretcher with feet towards front.

Lift stretcher and lower stretcher six times.

On the command "Change," stretcher is lowered to the ground and Nos. 1 and 2 change places, No. 1, the new "patient," having his head towards the front. This ensures that No. 3 does not lift the heavy end of the patient twice running.

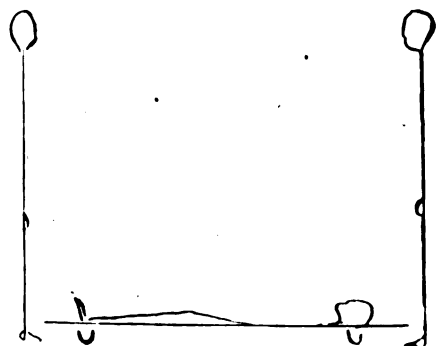
When No. 3 lies on the stretcher he places his feet to the front.

This goes for all the exercises.

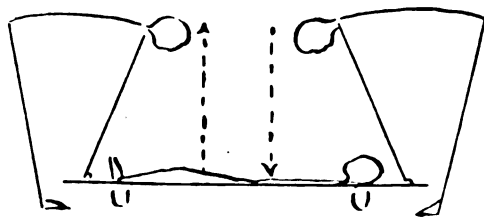
Stretching Exercise.—Arms flinging. Rest easy.

EXERCISE II.

POSITION

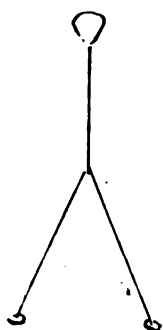


EXERCISE

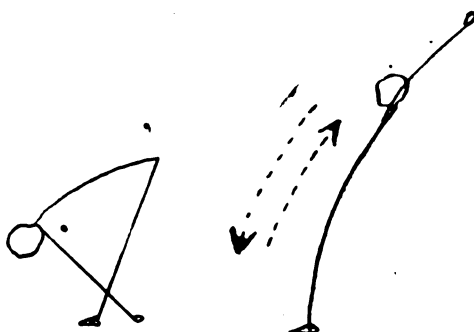


Raise and lower stretcher six times, keeping legs stiff.—Change—Six times—Change—Six times—Rest easy.

POSITION



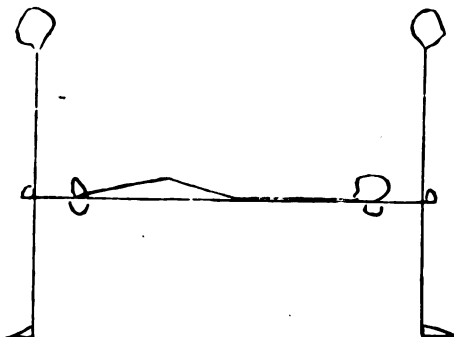
EXERCISE



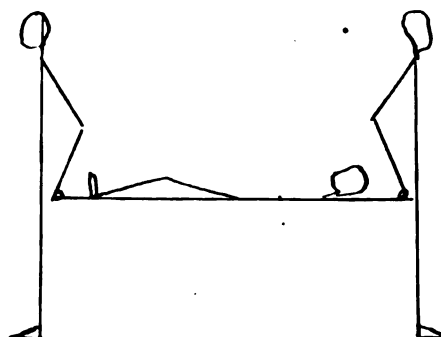
Stretching Exercise.—Touch ground behind heels.—Up and stretch well back.—Rest Easy

EXERCISE III.

POSITION



EXERCISE

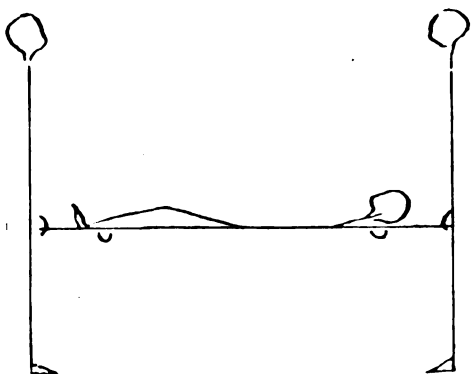


Carry on as in Exercise I.

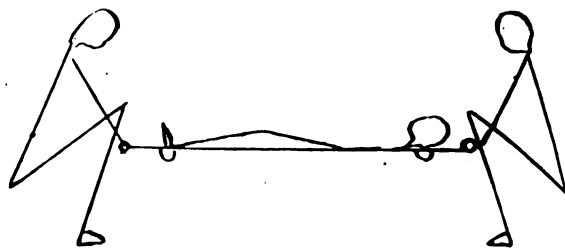
Stretching Exercise.—Arms swinging forward, backwards and over. Swing arms loosely.—Rest Easy.

EXERCISE IV.

POSITION



EXERCISE



Knees kept closer together than in ordinary "full knees bend."

POSITION

EXERCISE



Stretching Exercise.—High kicking. Right hand and left foot and vice versa.—Rest Easy.

EXERCISE V.

The same as Exercise II, except that lifters stand with their backs to the stretcher.

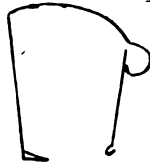
Stretching Exercise.—Feet apart. Hips firm. Trunk backwards bending.

EXERCISE VI.

The same as Exercise IV, except that lifters have their backs towards the stretcher.

POSITION

EXERCISE

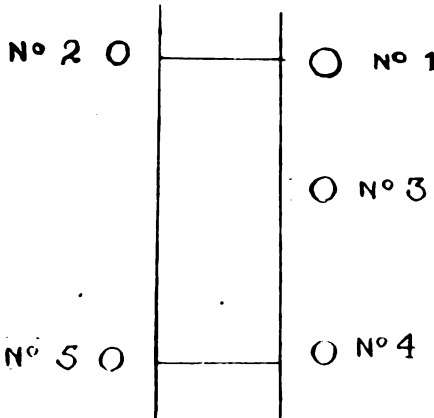


Stretching Exercise.—This must not be a stiff “touch toes.” The trunk and arms must flop down loosely; fingers curled up; legs straight.

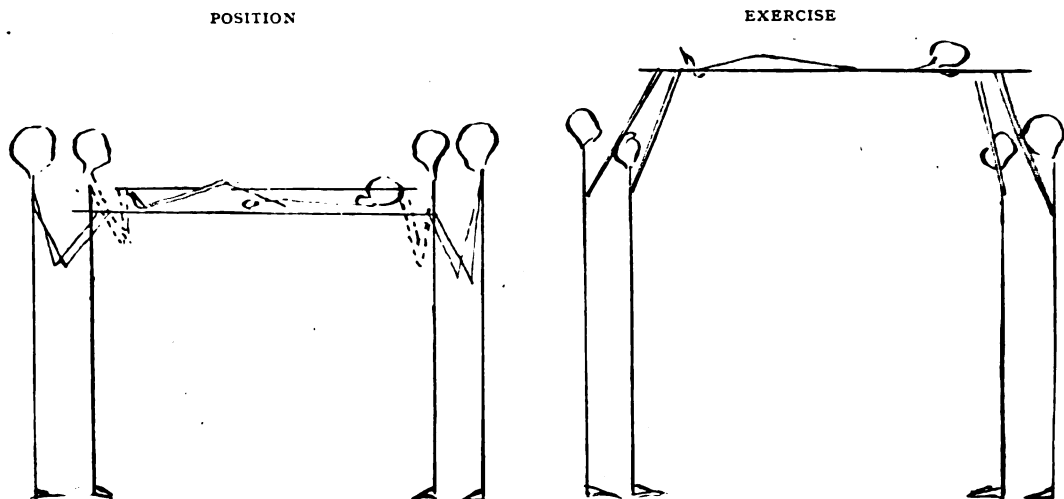
Note.—Exercises V and VI should be omitted until troops have had at least seven days on this series.

After Exercise VI, positions are changed for the final exercise.

All move up towards the right of the squad until there are 3 men on the right and 2 on the left of each stretcher.



EXERCISE VII.



No. 3 is the first patient, followed by Nos. 1, 2, 4 and 5 in that order.
In this exercise five lifts should be done between each change-over.
Rest easy.

STRETCHER HURDLES.

The stretchers are put out in two rows, standing on their sides as hurdles. The front rank of each team goes to one end of the line and the rear rank to the other.

A relay race is run.

Repeat with both teams at the same end. Runners go down the line, touch some object such as a fence and come back to the waiting member of the team. (Those who have run should move down the line of stretchers, ready to prop up any which are knocked over.)

The above complete schedule of exercises should be carried through in forty-five minutes by a well-trained squad.

ON THE VIABILITY AND TRANSMISSION OF DYSENTERY BACILLI BY FLIES IN NORTH AFRICA.

BY MAJOR W. STEWART,

Royal Army Medical Corps.

DYSENTERY has now been recognized for centuries as one of the major problems of armies in the field and British Armies in Mediterranean regions have suffered considerably from this bacterial infection in the past. With the advent of the warm weather in North Africa the fly-scurge appeared and was followed soon by cases of acute bacillary dysentery. It appeared that it would be interesting to make a few observations on flies in relation to dysentery in Algeria and particularly after carriers of dysentery bacilli had been found among the native population. The outlook and gravity of bacillary dysentery has, of course, been much altered with the use of the newer sulphonamides but, nevertheless, it still remains an important problem. The few days following the successful treatment constitute a period of very considerably reduced physical efficiency although the source of the toxæmia may have been wiped out in the early stage.

Sanitation and customs generally in North Africa are conducive to the spread of disease by flies and the multitudinous other insects. It is quite a common custom for the inhabitants to defæcate and urinate on any site, sheltered or otherwise. Deposits of fæcal matter may

be seen in abundance almost anywhere. The latrines in populous areas are quite open to urine-loving flies and faeces are often littered over these same latrines.

Throughout the experimental work it was attempted to simulate as closely as possible the conditions seen in the countryside around ; the faeces under the hedgerows, under bushes, in the recently abandoned slit-trench or air-raid trench. In such conditions flies were able to satisfy to the full their preference for such feeding-grounds.

Among the native population, dysentery carriers are common. These people have a stool normal in appearance and any abnormalities diagnostic of dysentery are absent in wet films. They suffer from no obvious disability from the condition and no suggestion of active ulceration is present. In the first 149 Arab personnel whom the writer was asked to pass as suitable for employment in bakeries, etc., 23 gave positive cultures ; 10 were Flexner, 8 Sonne, and 5 Schmitz. An interesting point subsequently arose in that various units seemed to have an entirely different proportion of positive cases while some had none at all. It was later learned that the units with none or few had been recruited from the hills while those with the higher proportion were from villages near more densely populated regions.

EXPERIMENTAL.

The medium used was MacConkey's bile-salt-lactose agar. The more recent desoxycholate-citrate was not available at the beginning nor was it absolutely necessary. The writer understands that Boyd's valuable work was done with MacConkey's medium and Boyd has added very considerably to our knowledge of this bacterial infection. Good work can be done with this media. The agglutinating sera were those supplied by the R.A.M. College. Agglutinating reactions were done in the water-bath with readings taken twenty-four hours afterwards. The biochemical reactions were as those given in "Laboratory Diagnosis of Dysentery in the Middle East, Technical Instructions, 1941."

The apparatus used was a "compo" ration box which was covered over with some mosquito-proof gauze netting. At one end an inlet was left for Petri dishes—this was suitably screened. The whole could be sterilized completely. Flies were caught in the hospital kitchen and latrines with the help of a butterfly net. The specimens of faeces were those sent to the laboratory as routine culture specimens ; a suitable amount was placed in a sterile half Petri dish and this was placed in the box along with the flies. This specimen and the flies were left untouched throughout the one experiment. The faecal specimen was left entirely open to the flies and also to the outside air through the mosquito netting. Another sterile half Petri dish with a little sterile distilled water was put in the box usually on the second day. Without water the flies died off in two to three days. Another small container was put in with a small amount of sugar.

At intervals, MacConkey plates in duplicate were put in the box and left open. It was hoped that the flies would transmit the bacteria from the faeces to the plates. The plates were then cultured over-night. At the beginning blood-agar plates were also used but it was found that the growths on these were so abundant and profuse that they had to be abandoned and MacConkey's plates alone appeared to give satisfactory results.

By this method the specimens of faeces dried up, as they did in the countryside around, on closet-seats and in latrines.

The number of flies in the box could be controlled and the time that the MacConkey plates were in was known.

The box throughout the experiments was kept in the laboratory out of the direct rays of the sun—natural faecal deposits are not always directly exposed to the sun's rays.

Surface contaminants were found, not in large numbers, and could be identified. The box was covered up during the dusting of the laboratory.

Some preliminary investigations had to be done first. The viability of dysentery bacilli in specimens under such conditions had to be found. Specimens of dysenteric stools were put in a similar box and cultures were made from these daily. As a rule, the specimens were completely dried up the following day but sometimes the mucus might take longer. If the

specimen had dried a small area of it was moistened with a few loopfuls of peptone water and emulsified. Cultures were then made directly on to MacConkey plates. The time the specimen was passed was known and the time of culturing.

In most specimens no *B. dysenteriae* Flexner was found after the first or second day but, in four different specimens, positive cultures were obtained on the 5th, 8th, 10th and 12th day. In the case of the last specimen it was passed at 12.00 hours on the 15th of the month and the last positive culture was at 11.30 hours on the 27th of the same month.

The small amount of sterile "drinking-water" had also to be considered. It was theoretically possible for the flies to transmit the bacilli from the fæces to the water and then subsequently for these same bacilli or their offspring to be transmitted to the culture plates. In order to assess this, Flexner bacilli were tested for their viability in water. Some rain-water was obtained and passed through a Seitz for sterilization (the water-supply of the area was subject to chlorination). Flexner was then washed off an agar-slope with some of this water and put in a universal container and kept in the laboratory in the daylight but out of direct sunlight. Cultures were made each day.

The Flexner bacillus survived for the long period of thirty-eight days.

The viability of Flexner in the rain-water necessitated repeated changings of the "drinking water" and of the sugar container. These precautions were duly observed.

The culture plates were left in varying times. The colonies practically always remained discrete and could be picked off for further identification.

Under the experimental conditions outlined above, the longest periods that the flies were found to transmit *B. dysentery* from one specimen of fæces were :—

B. dysenteriae Flexner — 273 hours = 11½ days.

B. dysenteriae Schmitz — 297½ hours = 12½ days.

In one instance *B. faecalis alkaligenes* was found in the culture of the MacConkey plate five days after dysentery bacilli had disappeared and fifteen days after the specimen of fæces had been put in the box; *B. faecalis alkaligenes* had not been found in the original culture.

It was sometimes found that abundant colonies of *B. coli communis* and coliforms of paracolon type were still present a considerable time after *B. dysenteriae* had disappeared. The longest duration of one experimental batch of flies was one of twenty-three days; on the last day *B. coli communis* was found fairly abundantly yet cultures made direct from the faecal remnants were completely sterile.

Culture plates exposed as controls with fæces and no flies as a rule gave only an odd colony of *B. coli communis* and the writer considers that aerial contamination was not a factor in the results obtained.

B. faecalis alkaligenes and coliforms of paracolon type are common in the bowel in North Africa during convalescence from bacillary dysentery.

The number of dysentery colonies produced during the first period of the culture plates in the box is an interesting figure. During this first period the specimens of fæces was still moist. The time elapsed since the specimen had been passed varied but it was always within the first twenty-four hours. The average number of colonies of *B. dysenteriae* was 7.6 colonies per fly per hour.

Throughout the experiments care was taken that no direct sunlight fell on the box as direct rays have a marked bactericidal effect. Cultures of Flexner exposed to the direct rays of the sun on rather a dull day were found to be sterile in one hour twenty minutes; during the much warmer days this time would be considerably lessened.

DISCUSSION.

Much work has been done on the dysenteries and of notable value is that of Boyd who has had vast experience of this infection under military conditions in India and more recently in the Middle East. This worker has largely incriminated the fly as the spreader of this disease and he has organized suitable means for combating this nuisance and improving stationary camp sanitation. The standard methods of laboratory technique in the investi-

gation of this disease in service laboratories mainly follow upon his work. Working in association with Hamilton Fairley, he has already described findings of this disease in the Middle East [1]. Cruickshank and Gillespie [2] found *B. dysenteriae* Flexner viable in faecal specimens for some fifteen days but these writers do not state whether the specimens were allowed to dry up or not.

Weil [3] suggests that in the States the part played by flies in the spread of the disease is probably small and that the immediate vehicle of infections is contaminated food. Dysentery infection is carried from one locality to another by man and patients with chronic dysentery are mostly incapacitated and not likely to play a great part in the spread of the disease.

Lowbury [4] reports the survival of *B. dysenteriae*. In his results the rectal swab used partially approaches the circumstances of the experiments described above and he found *B. dysenteriae* Sonne survive for seven days and Flexner for two days.

The main idea of the writer was to simulate as closely as feasible in the experimental work the promiscuous defaecation so prevalent in the neighbourhood. Faecal material so deposited gives free access to hordes of flies and is often not exposed to direct sunlight. If these flies in North Africa had been the predominant vehicle of transmission one would expect a continuous and pretty constant stream of cases all through the fly season. This was not so—the positive primary cultures obtained by the writer during the course of these experiments were March—4, April—16, May—32, June—91, July—41.

During August and September there was a marked fall in cases yet flies were still with us in considerable numbers. It is quite true that anti-fly measures were adopted but in spite of everything the flies persisted up to the end of September. At this time there was a considerable drop in temperature accompanied by marked diminution in the fly population and also the survivors seemed much less agile in flight. As an example of the prevalence during mid-September the following incident may be quoted. A colleague with one swatter was able to kill 82 flies in twelve minutes in a small mess-room. During these effective anti-dysenteric measures, this fly-conscious disciple of Boyd was entirely unaware that he was being timed nor does he yet know.

Since September there have been short spells of relatively warm weather with temporary re-appearance of flies but there has been no increase in cases of dysentery beyond the few sporadic cases. It seems to the writer that transmission from one human being to another either directly or by food is also an important factor. The cogent, agonizing and frequent urgency for evacuation of the half-teaspoonful of bloody mucus knows few masters and, once infection has broken out, spread by closet-seats, latrines, food-handling, etc., is an easy route.

The dysentery carriers among the Arab personnel were quite unexpected although not surprising. None of these people were incapacitated. All had already been medically examined and a considerable number were actually in employment—the immediate requirements of ancillary services may temporarily wash-out bacteriological standards on active service.

Manson-Bahr demonstrated that the fly could act as carrier-in-the-bowel of dysentery bacilli for five days. In the experiments now described nothing was found to suggest that the dysentery bacilli were in the bowel of the fly as everything can be explained by direct mechanical transmission either by the feet or other part of the external surface of the body. It did seem in the course of the work that the flies might be harbouring *B. faecalis alkaligenes* and other coliforms in the bowel but this point was not fully determined.

The long survival of Flexner bacilli in rain water is corroboration of the menace of uncontrolled water-supplies in the field but this matter is already effectively and adequately dealt with in the equipment available to all Service personnel.

The above experiments corroborate the great menace that flies may be in a climate where they are prevalent and in a community compelled to make shift in sanitation.

As a precautionary measure against the possibility of spread from one human being to another it has been the writer's practice to do as many specimens as possible before the discharge of patients back to their units.

Once the ætiology of an outbreak in a unit has been determined it seems more valuable to be able to pass back to that unit personnel proven negative bacteriologically than it is to go on using the limited amount of media and time at our disposal for further primary cultures.

SUMMARY.

Dysentery bacilli in North Africa have been found viable in fæces eleven days after specimen has been passed and with the specimen being allowed to dry as under natural conditions.

Carriers of dysentery bacilli have been found in the native population of North Africa and these people may play an important part in the outbreaks of this disease. Flies have been found capable of transmitting dysentery bacilli from specimens of fæces to culture plates for the long period of eleven and twelve days. Nothing was found in the experiment which could not be explained by direct mechanical transmission of these bacilli.

I wish to express my indebtedness to Colonel L. Handy, late R.A.M.C., the Commanding Officer of the base hospital where this work was done, for his encouragement and for permission to forward these findings and to Serjeant F. Hearn, R.A.M.C., for his co-operation throughout this investigation.

This work was not quite completed owing to circumstances beyond the writer's control; perhaps in the future, in other fly-infested areas, it will be possible to carry on to the further stages.

REFERENCES.

- [1] *Tropical Diseases Bulletin*, 1942, **39**, 319.
Trans. Roy. Soc., Trop. Med. & Hyg., 1943, **36**, No. 5, 253-278.
- [2] *Lancet*, September 12, 1942, p. 322.
- [3] *Jl. Immunology*, 1943, **46**, No. 1, 13-46.
- [4] *Bull. E.P.H.L.S.*, August, 1943, **2**, 75.

CONGENITAL CYSTIC DISEASE OF THE LIVER.

BY MAJOR J. K. WILLSON-PEPPER,

Royal Army Medical Corps.

BELOW are recorded the details of a case of a West African negro child from whose liver was removed a tumour the size of a coconut which weighed 2 lb. in the fresh state and which is considered to be of congenital cystic origin.

References to the literature are given.

The patient was a three-year old female child of the Yoruba race (Southern Nigeria).

The parents had noticed an unusually swollen abdomen two months before bringing the case to hospital. No other details are available concerning the child's symptoms.

On admission the child was found to be feeble, wasted and anæmic.

The abdomen was grossly distended and a smooth circumscribed mass could be palpated arising from the right upper quadrant, apparently attached far back. There were no other objective signs and no abnormality was found in the urine.

Limited hospital facilities precluded further pre-operative investigation.

The mass increased rapidly in size and the general condition of the child deteriorated further but there was no jaundice or vomiting and the child continued to take her food.

The case was given a short course of N.A.B. as a prophylactic against latent yaws and some intramuscular liver extract as a preliminary to operation.

Operation.—Anæsthetic—ether.

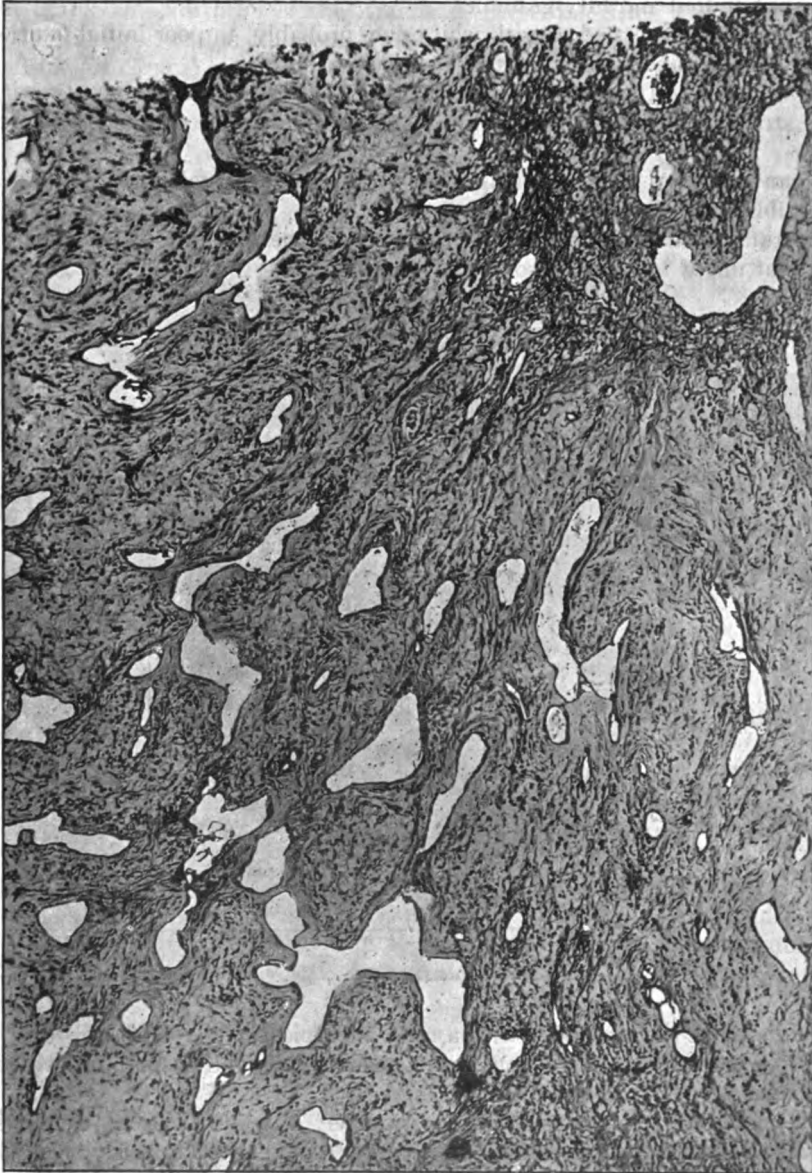
The abdomen was opened through a long right paramedian incision. There was some free fluid.

A solid tumour, filling the abdominal cavity and resting on the pelvic brim, was delivered

outside the abdomen without difficulty and was found to be attached only to the lower surface of the right lobe of the liver.

There was no sign of metastases or of any other intra-abdominal disease.

There was some difficulty in finding the correct tissue plane but, on approaching it from



Section of tumour showing epithelium-lined spaces.

behind, the mass shelled out quite well leaving a raw liver surface which was oversewn with interrupted mattress sutures.

A soft rubber drain was left in for twenty-four hours.

The child became very ill for three days and then rallied. The skin incision broke down on removing the sutures but the deeper layers remained healed.

The general condition again deteriorated and the child died eleven days after operation. There was no post-mortem examination.

Pathological Report.—Macroscopic appearances : The tumour is pyriform and the external surface is irregularly nodular.

The circumference at the widest part is thirty centimetres and the weight of the fixed specimen is six hundred and fifty grammes.

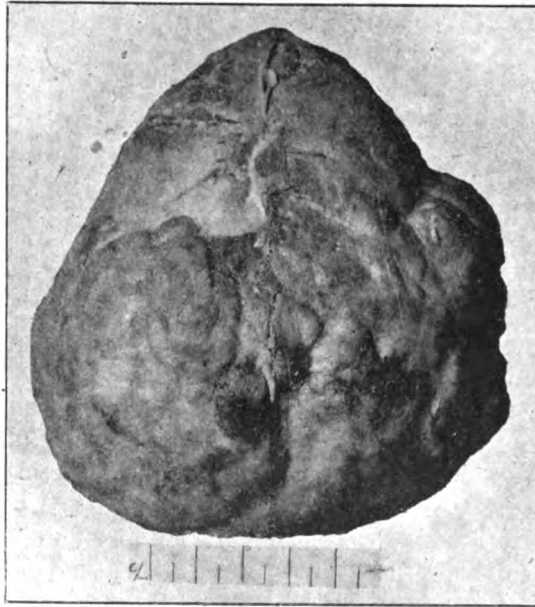
The cut surface is a mottled greyish white due, probably, to poor initial fixation.

The general appearance and consistency suggest a fibroma.

Histological Report.—Description : The basis appears to be adenomatous, with varying surrounding stroma, but the epithelial-lined spaces are so dilated as almost to resemble capillaries.

But one can make out all transitions from what resemble small bile duct-like structures to those resembling capillaries.

It is unfortunate that the edge of the tumour and the liver and other tissues were not available as that might have given some clue to its origin.



The tumour (macroscopic)

There is an area at the very edge with a few ? metaplastic liver cells.

There is some infiltration of mononuclears, plasma cells and eosinophils which I do not think significant.

Interpretation : This recalls congenital cystic liver. The adenomatous elements resemble bile ducts, from abnormalities of which "cystic liver" is believed to arise.

Discussion.—As a result of a careful microscopic examination, Major Niven has put forward the tentative opinion that this tumour is of congenital cystic origin.

The association of this abnormality with similar changes in the kidneys has been reported many times and, in rare instances, cysts have also been found in the pancreas, spleen, ovary and lung.

The subject has been extensively discussed in recent years by various authors among whom, in this country, may be mentioned Sears, Wakeley and MacMyn, and, in America, Montgomery, Stoesser and Wangensteen, Vanderveer and Moolten.

It is not possible to state whether any parasitic infection of the liver may have played its part in producing the tumour in this case.

Unfortunately it has not been possible to present all the data relating to it owing to the many difficulties occasioned by the war. I regret that I am unable to give an autopsy report but, at operation, I did not feel any abnormality in the kidneys.

I wish to thank Dr. Northrop of the American Baptist Mission Hospital, Ogbomosh, Nigeria, for his kind permission to operate on his case, for his assistance during and after operation and for his clinical report.

I also wish to thank Dr. B. G. T. Elms and Mr. J. E. Knight, of the Medical Research Institute, Yaba, Lagos, for their valued assistance and for the care with which the specimens have been prepared and photographed, and Major Janet S. F. Niven, R.A.M.C., for her report and opinion on the microscopic sections and my Commanding Officer for permission to forward this case for publication.

REFERENCES.

- SEARS, GORDON. "Congenital Cystic Disease of the Kidneys, Liver and Pancreas," *Guy's Hospital Reports*, **76**, Series 4.
 WAKELEY, CECIL P. G., and MACMYN, D. J. (1931). "Non-Parasitic Cysts of the Liver," *Lancet*, September 26.
 MONTGOMERY, ALBERT. "Solitary Non-Parasitic Cysts of the Liver in Children," *Arch. Surg.*, **41**, No. 2.
 STOESSER, A. V., and WANGENSTEEN, OWEN. "Solitary Non-Parasitic Cysts of the Liver," *Amer. Journ. Dis. Child.*, **38**, No. 2.
 VANDERVEER, EDGAR. "Congenital Non-Parasitic Single Cyst of the Liver," *Amer. Journ. Surg.*, N-S, 29-2.
 MOOLTEN, SYLVAN E. (1943). "Pathogenesis of Congenital Anomalies of the Intrahepatic and Extra-hepatic Bile Ducts," *New York State Journal of Medicine*, April 15.

Reviews.

ILLUSTRATIONS OF REGIONAL ANATOMY. Fifth Edition. By E. B. Jamieson, M.D. Edinburgh: E. & S. Livingstone. 1944. Seven Sections. Price 75s.

Jamieson's "Illustrations of Regional Anatomy" have justly earned the reputation of being the best collection available and the appearance of the fifth edition so soon after the fourth enhances their claim to pre-eminence. The format is unchanged but colours have been added lavishly to many plates and fine art paper has been employed to show off the colours to best advantage. As a result already fine plates have been improved, many details stand out more clearly and it is noteworthy how by skilful draughtsmanship and the use of colours the impression of depth is conveyed. Certain minor inaccuracies in legends have been corrected, an admirable new figure showing a dissection of the female perineum has been added and the plates are now numbered consecutively from 1 to 319 for the convenience of those who wish to have the seven parts bound in a single volume.

The arrangement in relatively small sections is an advantage from the viewpoint of the Army surgeon. The standard anatomical textbooks are too heavy for easy carriage and, besides, many specialist surgeons are mainly concerned with the anatomy of certain regions. They can make their selection with confidence from this series and will find the beautifully accurate illustrations an invaluable method for rapid revision of their anatomical knowledge when confronted with some clinical or operative problem.

THE PREVENTION AND TREATMENT OF DISEASE IN WARM CLIMATES. By Dr. Gerald Garry, M.B.E., M.D., M.Ch., M.A.O., R.U.I. London: Medical Publications, Ltd. Pp. 94. Price 8s. 6d.

In 94 pages Dr. Garry has produced what J. B. Christopherson has aptly described in his foreword as the shrine containing the practical experience and the views of a doctor who has been working for years in the sub-tropical town of Cairo.

The book contains a list of contents but no index and no bibliography. It is in no sense a textbook and the impression that it is a testament of faith is heightened by the naivete of literary style.

The first 59 pages comprising Part I, are devoted to five chapters on general considerations, food, water, exercise, and the prevention of diseases.

Part II contains short notes on 38 diseases arranged in alphabetical order to which is added two appendices, I on sulphonamide drugs, and II various recipes.

On page 57 under "Human Carriers" there occurs the following "soft impeachment."

"The Gallipoli campaign offers a tragic example of how bacillary dysentery is spread, when, on the authority of Manson-Bahr, 120,000 casualties were evacuated from the Peninsula in five months, the main cause of the failure of that enterprise."

All ranks of the R.A.M.C. will certainly find much to interest them in the perusal of the work but will not find in it any addition to their collection of A.M.D. Bulletins.

HUMAN REPRODUCTION AND VENEREAL DISEASES. By Dr. John Drew. London: Faber and Faber, Ltd. 1944. Pp. 124. Price 3s. 6d. net.

This little book aims at giving information about sex matters and also about venereal diseases which are intimately bound up with them.

The sex organs, male and female, are described in some detail and the whole subject of how the species is reproduced is clearly explained.

There follows an account of the commoner venereal diseases, how they are acquired, how treated and how avoided; stress is laid on the fact that they are a common cause of sterility.

The final chapter deals with the control of V.D. and there is a postscript urging education in sex matters and the necessity for drawing aside the veil which has so long covered the subject.

"Dr. John Drew" is, apparently, a pseudonym for a doctor who obviously knows what he is talking about. It seems a pity that he should have chosen a name which appears twice in the Medical Register of 1943 and, whilst most of his facts are correct, many people will disagree with some of his opinions; incidentally the germs which cause V.D. are *not* killed by cold, as stated on page 47.

Dr. Drew tilts at our antenatal service and at the "official mind for its timid and prudish advertisements"; many think the former is doing good work and it should be remembered that advertisements are controlled by the proprietors and editors of journals. On the other hand, most parents would agree that parents do not usually give their children the instruction which they should and it may be that the "failure of the church to attune its teaching to modern life" is a contributory factor to the prevalence of V.D.

The theme of this book is that the education of the young on sex and V.D. matters is all-important. The difficulty is that the average parent does not know how to begin.

T. E. O.

STRUCTURE AND FUNCTION AS SEEN IN THE FOOT. By Professor Wood Jones, D.Sc., F.R.S., F.R.C.S. London: Baillière, Tindall & Cox. Pp. 322.

Dissection of the foot in one's student days does not evoke a very pleasant memory. It calls up no nostalgia. Rather late in the term the jaded student displayed, in a desiccated and fragmentary limb, the four muscular layers of the sole. Then he learnt the "actions" of these muscles, on the erroneous basis of action from a fixed proximal "origin" on a movable distal "insertion," as though the foot was a rather unsatisfactory homologue of the hand. Later on, the foot remained a Cinderella. The clinical approach is not realistic. Various "degrees" of flat foot are described in some schools as progressive deviations from a hypothetical ideal and "natural" foot. Others regard the presence of any arch at all as an acquired abnormality, one of the stigmata of an artificial civilization.

Wood Jones describes the structure of the foot in detail but the particular value of the book lies in the realistic interpretation of function.

He points out that the mechanical principles involved are quite different from those in the hand. In the case of the hand, the muscles act from their origins in the forearm on the unsupported and freely *movable* hand. But we stand on our feet and, in them, the "insertion" of a muscle is often the fixed point whilst the origin in the leg is the movable part on which it acts. This inverted type of action is necessary for balancing and walking. Another important point which at first sight appears to be inconsistent with physiological principles is that, in the foot, agonists and antagonists frequently contract synchronously. Not of course with the object of producing movement but to stabilize and support the complex bony structure in the various phases of standing and walking. The muscular control of the toes is an example of this paradoxical synergism, particularly in the case of the big toe. The hallux, controlled by a complex system of muscles, is an important lever for propulsion in walking.

Wood Jones' views about the controversial arch are moderate and reasonable. He regards the outer half of the foot as a static structure, not arched, and designed for support. The inner part is arched. It is a mobile and resilient portion capable of those changes in shape which are necessary for balance and propulsion. The arch is a natural feature of the human foot but it is not a fixed arch of the conventional architectural type. It is in fact composed of bony elements which articulate by surfaces with varying curvature; it is supported by ligaments and influenced to some extent by various muscles. It is, therefore, capable of limited and controlled deformation according to the demands of the movement.

An understanding of these principles is desirable. The book is recommended to all surgeons who are interested in the foot. It should be read in conjunction with Lake's book "The Foot."

RENAL LITHIASIS. By Charles C. Higgins, M.D., Cleveland Clinic, Cleveland. London: Baillière, Tindall & Cox. 1943. Pp. xii + 140. Price 16s. 6d.

An extremely well-produced monograph of peacetime standards, which, though it contains nothing new, is well worth reading for it stresses the importance of diet in the treatment, control and prevention of Renal Lithiasis. The importance of this is not sufficiently appreciated by the profession as a whole.

Food values are tabulated and diets suggested but that the various articles of diet should be measured in inches is odd and less convenient than by weight; and amounts measured by " $\frac{2}{3}$ cup," " $\frac{1}{2}$ cup scant," "1 cup heaping" or "slices" are too inaccurate.

The discussion on symptomatology and surgical treatment along with the illustrations does not maintain the high standard of the rest of the book and its inclusion suggests that too much has been attempted in a book of this size. Despite this it is recommended to those who are called upon to treat what can be a most difficult type of case.

AMERICAN NEWSLETTER. Prepared by the American Medical Association.

We have received through the courtesy of the U.S. Office of War Information a copy of the above communication.

The object of the Newsletter, which summarizes a wide range of subjects, is to make it known that, although the world-wide exchange of information on the progress of science has been interrupted, research is still very much alive in the United States of America.

Notices.

LOCAL SULPHANILAMIDE THERAPY.

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UNITED NATIONS RELIEF AND REHABILITATION ADMINISTRATION.

HERBERT H. LEHMAN, Director-General of the United Nations Relief and Rehabilitation Administration, has announced the appointment of Dr. Wilbur A. Sawyer of New York as Director of Health. He will be assigned to Washington and will be in charge of the Health Division of U.N.R.R.A. and be responsible for planning and directing health and medical activities. His duties will require frequent visits abroad to the regional offices and field work.

THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE,

28, PORTLAND PLACE, W.1.

SIR STANLEY WOODWARD, C.M.G., C.B.E., M.D., F.R.C.P., D.L., has been appointed President of the Royal Institute of Public Health and Hygiene. He was elected to this office at the Annual General Meeting held at the Institute on Thursday, May 25, 1944.

CHELTENHAM COLLEGE SCHOLARSHIP LIST, 1944.

J. R. SAMUEL has been awarded a £60 R.A.M.C. Exhibition.



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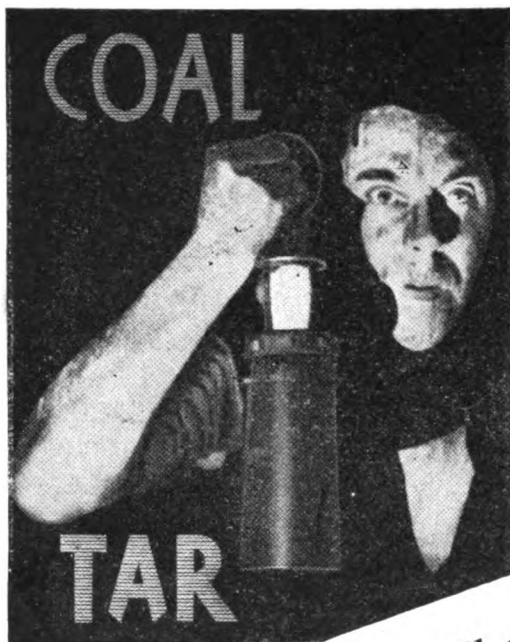
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NEUROLOGICAL EXPERIENCES IN WEST AFRICA.

BY CAPTAIN R. A. HENSON,

Royal Army Medical Corps,

Graded Physician and Neurologist.

THE literature of tropical medicine contains few references to diseases of the nervous system amongst the natives of Africa. In this communication a description is given of some of the cases of neurological interest seen during a tour of duty in West Africa. The cases were quite unselected, occurring during the ordinary run of admissions of native soldiers to a West African Casualty Clearing Station. The unit was stationed in Nigeria and, though its location was at one time in the arid north and at another in the rain forests of the south, the patients were always drawn mainly from one infantry brigade and its ancillary troops. All but eight were Nigerians, coming from divers tribes, though the majority were Hausas. Out of 2,500 admissions to the medical section of the C.C.S. 187 cases of neurological interest were seen and to this number have been added 10 cases seen either in other military hospitals or in civilian hospitals in Nigeria or Sierra Leone. There was one female case in this series but none of children.

The neurological examination of the average African patient was not an easy matter and it might well be compared with an examination of the nervous system of a European child. The multiplicity of tongues made history-taking difficult but the main obstacle in this direction was the fact that the sense of the passage of time was found to be grossly lacking in the African. Few patients could state their age and they could rarely give any indication of the length of duration of symptoms except when the illness was of only a few days standing. The patients could rarely do more than demonstrate which part of the body was afflicted and it was found useless to attempt to discover, for instance, the characteristics of any type of pain or details of any particular symptom. In the physical examination the outline of the pupil was difficult to see in many cases. This was partly due to pigmentation and partly to the fact that cases were examined in a very bright light. For satisfactory ophthalmoscopy the use of atropine as a pupillary dilator was required. Sensory testing was done in full on the early cases but it became apparent that the results were quite incorrect; the extreme suggestibility of the African provided an additional complication in this connexion, hysterical sensory loss being of frequent occurrence. The plantar response could rarely be elicited owing to the thickness of the skin of the sole of the foot.

Facilities for investigation were naturally limited in a unit working under field conditions. Lumbar puncture was performed wherever indicated. The examination of the spinal fluid was limited to a cell count, a rough indication of the protein content by the ring method, using absolute alcohol, and the Ide test. The Ide test was the standard serological test used for the detection of syphilis and it was done on both blood and spinal fluid. Bacteriological examination was limited to the investigation of smears, there being no facilities for culture. A portable X-ray set formed part of the unit equipment but the shortage of films prevented the taking of more than a minimum of pictures. It was possible to do full post-mortem examinations in all cases of death and histological examinations were made by the Government Pathologist to the Colony.

Of the 197 cases seen 33 were of injuries to the nervous system, there being 30 cases of head injury, 1 of spinal cord injury and 2 of peripheral nerve injury. Of the 30 head injuries 29 were acute. These cases varied in severity from scalp wounds without loss of consciousness to severe injuries leading to death within a few hours of admission to hospital. All were cases of closed head injury. Roughly half of the head injuries were caused by blows from machetes; the other half were blunt injuries sustained in road accidents. It was not found possible to assess the length of the post-traumatic amnesia in any case and, by reason of the language difficulty, an assessment of the degree of confusion was often impracticable. Consequently exact assessment of the degree of commotio cerebri in any case was not easy and, in fact, from the point of view of disposal, it was never necessary for all the cases who recovered went straight back to duty. Three cases died, 2 from very severe injuries with massive brain damage and 1 during the administration of chloroform whilst his fractured mandible was being wired. Amongst the 26 cases who recovered headache was a rare complaint. Indeed only 3 complained of headache, at any time, in spite of the fact that there were several moderately severe injuries in the series, the severity being judged by the length of confusion and by the presence of physical signs of cerebral damage. There were 2 cases of paresis of the 6th cranial nerve, in 1 case bilateral, 2 cases of inequality of the pupils during the acute stage and 1 case of a 7th nerve weakness of lower motor neurone type. Every case which had a scalp wound considered himself recovered from the head injury by the time the wound was healed and often before. The scalp wounds were treated in the usual way with careful toilet of the wound edges and local application of sulphanilamide powder and no cases of sepsis arose.

Here is a typical case history :

Case 1.—An African soldier was admitted to the C.C.S. one evening with a large scalp wound caused by a blow from a machete. On his R.M.O.s evidence he was unconscious on examination three-quarters of an hour after injury. When seen two hours after injury he was still confused and could not give an account of himself although he knew his name and complained of headache. He had a deep scalp wound 7.5 cm. long in the left fronto-parietal region. On probing the wound a long gash was seen in the outer table of the skull, co-incidental with the scalp wound and approximately of the same length. No depression of bone was visible. There were no neurological signs. The wound was filled with sulphanilamide powder and a head dressing applied. The next morning he was rational and fully orientated. The scalp wound was then excised and sutured under local anaesthesia. The same evening, less than twenty-four hours after injury, he was missing from the hospital! On his return he explained that he was now well and wished to be discharged to duty; he had been down to the market to buy food. He was retained in hospital for seven days until his scalp wound was soundly healed.

This story is quite typical of the whole small series. No case of head injury was retained in hospital more than two and a half weeks. Admittedly none of these injuries could be classed as severe and they were all closed injuries with rapidly healing wounds. Neurological signs too were rare. Nevertheless this small number of cases does at least suggest that the African stands head injury well. It is interesting to note that almost all of these patients were illiterates whilst the only case of the so-called post-concussional syndrome seen occurred in an educated, Europeanized African who complained of headaches and dizziness ten years after

an injury of doubtful severity which had left him with a small bony depression in the right parietal region. His symptoms were complained of whilst he was under treatment for dysentery. He was sent back to duty and did not return.

The African's apparent easy tolerance of head injury is illustrative of his reaction to pain and disease in general. In the light of recent research into the mechanism of head injury the great thickness of the African's skull cannot have any significance in this respect. The personality of the African is of importance in assessing his reaction to head injury. Speaking generally he is cheerful and happy in a rather childish way. In times of stress or controversy he is liable to become inordinately voluble and uncontrolled and, in drink, he is frequently violent. Family and tribal ties are very strong and he is superstitious to a degree. He is less liable to worry, anxiety and depression than the white man and, if circumstances are too much for him, his reaction is usually hysterical. These facts are illustrated in the paragraph on the psychoneuroses, cases of hysteria only being seen in this series. The African's general attitude to disease and pain is fatalistic and this seems to be the most important factor in determining his speedy recovery from concussion. Strangely enough his superstitious mind was never found to be troubled by the presence of amnesia for the time of injury. The African soldier is not without domestic and financial worries entailed by separation from home and family but it seems likely that they are less deeply affected by these trials than the British soldier; consequently there is less fertile ground present for the development of anxiety symptoms after a head injury. To sum up these observations, it is thought that the African is hard headed, both physically and psychologically, and the latter fact is the most significant in explanation of his smooth and rapid recovery from head injury.

Thirty cases of meningitis were seen, 25 of these being cases of cerebrospinal meningitis. The mode of onset in these sporadic cases was frequently with attacks of loss of consciousness, both true epileptic seizures and fainting attacks. As a result of this observation all patients admitted after an attack of loss of consciousness were regarded as possible cases of meningitis, especially if fever was present, and they were lumbar punctured on admission. In this way several early cases were diagnosed in the presence of minimal or even in the absence of meningeal signs. Seventeen of the cases were treated in the C.C.S. and one died. This case died of heart failure on the seventeenth day of illness. He had required two courses of sulphonamide to control his meningitis. Necropsy showed that the meningitis had resolved and it was likely that bad nursing contributed to his death. All of the other cases which recovered were back on duty by the twenty-first day after admission to hospital and only one case had any headache a week after admission to hospital. Indeed it was usually impossible to keep the patients in bed until their course of sulphapyridine was completed as they insisted that they were well by the third or fourth day after admission. Sulphapyridine was given in the usual dosage and by intravenous or intramuscular injection when required. Lumbar puncture was only performed once, on admission, unless the case failed to progress satisfactorily. There were no relapses after discharge from hospital. In spite of the fact that there had been in the past large outbreaks of cerebrospinal meningitis amongst the troops in the Colony only one case of post-meningitic headache was seen. This arose in a clerk and he had been left with blindness in the left eye following his meningitis. Again this series of cases is small but it is large enough to draw the conclusion that the African recovers from cerebrospinal meningitis more rapidly than the European, for all cases returned to duty three weeks after admission to hospital, their length of stay being the minimum period which had been decided upon. As, too, there had been large outbreaks of cerebrospinal meningitis in the Colony more cases of headaches and dizziness following meningitis should have been seen had these arisen in any number. Of the 5 other cases of meningitis there were 2 of tuberculous meningitis and 1 each of pneumococcal, streptococcal and *B. influenza* infection, the last of which recovered.

Lobar pneumonia, the pre-eruptive stage of smallpox and subtertian malaria often presented with a meningeal picture and lumbar puncture had to be resorted to for the establishment of the diagnosis, but when these cases had been excluded there remained a group of 15 cases which have been labelled "meningism." These patients presented with the com-

plaint of severe headache and fever of short duration. On examination the temperature was frequently 104° F. and in 1 case it reached 105° F. There were varying degrees of neck rigidity and Kernig's sign was usually positive. In no case was there any signs of involvement of the substance of the central nervous system. There were never any signs or symptoms of respiratory disease, no rash was found and the blood was consistently negative on examination for malarial parasites. At lumbar puncture the fluid was generally under increased pressure and in 1 case only was it slightly turbid. No clot formed on standing. The cell count varied from 3 to 120 cells per c.mm. In 2 cases the pleocytosis was polymorphonuclear but in the other 13 the pleocytosis, if present, was lymphocytic. Smears of the C.S.F. from each case were examined for organisms with negative results. The first 9 cases were treated with full dosage of sulphapyridine because one was nervous at that time that an early case of cerebrospinal meningitis might be missed. In this series the fever settled within forty-eight hours and recovery was complete. The last 6 cases were given symptomatic treatment only and their recovery was equally complete although the temperature required about five days to settle. It is possible that at least some of these cases were ones of acute lymphocytic chorio-meningitis. The 2 cases with a high polymorphonuclear count in the spinal fluid may have been early cases of cerebrospinal meningitis but neither had more than 90 cells per c.mm. in the C.S.F. and, in the proved cases of cerebrospinal meningitis, the cell count was always much higher and organisms could usually be demonstrated. Both of these cases were in the group treated with sulphapyridine. There was no evidence that the syndrome described was infective. An attempt to reproduce the disease in the local hedgehog failed.

One case of encephalitis was seen.

Case 2.—This man had a two-day history of epileptic seizures and was admitted in status epilepticus. On examination he was found to be unconscious, reacting only to vicious pinprick. He had marked signs of meningeal irritation with head retraction, opisthotonos and a strongly positive Kernig's sign on both sides. There was generalized hypertonia of the limbs, more marked on the left than the right. All tendon reflexes were exaggerated but were brisker left than right. The left plantar response was extensor. The abdomen was held rigid and could not be palpated. He was incontinent of urine. There were no other physical signs. Lumbar puncture showed a slightly turbid fluid under normal pressure. There were 50 cells per c.mm., 90 per cent lymphocytes, and the protein was slightly increased. No organisms were seen in a smear made from the centrifuged deposit. His fits were controlled with paraldehyde and, although the case was thought to be one of encephalitis, he was treated with full dosage of sulphapyridine of which he received 34 grams in five days and then sulphathiazole 14 grams in two days. He survived for one week, during which time his meningeal signs gradually decreased, the hypertonia of the limbs passed off until, at death, the tone of the right side was normal and there was only slight spasticity of the left arm and leg where the reflexes remained increased. Throughout his illness daily lumbar punctures were done. There were never more than 65 cells per c.mm. in the C.F.S. and there was always a preponderance of lymphocytes. Examinations for organisms, including acid-fast bacilli, were always negative. His blood count was normal. The urine contained a haze of albumin and the Kahn test was positive both in the blood and spinal fluid. Post-mortem examination showed intense congestion of the leptomeninges over the whole of the surface of the brain. The brain was intensely congested and very oedematous, the changes being most marked in both parietal and post-frontal areas. There was a small infarct in the left temporal lobe. Sections stained with hæmatoxylin and eosin showed intense congestion and oedema with neuronal degeneration and perivascular cuffing. The specimens proved unsatisfactory for accurate neuropathological examination.

Neurosyphilis was encountered more frequently than had been expected. Six cases were seen in life and 1 case was found at post-mortem in a case of sudden death. Conversely in the whole series of 2,500 cases only 4 patients with cardiovascular syphilis were seen. This may be explained by the fact that cardiovascular syphilis is more easily detected at the examination of recruits and also M.O.s seem to retain their cases of cardiovascular syphilis and invalid them personally. Three of the 6 cases presented with hemiparesis of gradual

onset. In 1 case the hemiparesis went on to a complete right hemiplegia in fourteen days, ending in death. At necropsy a large thrombus was found in the left middle cerebral artery, and microscopic examination showed the presence of syphilitic arteritis. In the second case the weakness came on over a period of forty hours, being sufficiently severe to prevent him walking or using his right arm and leg. The spinal fluid contained 35 lymphocytes; the Ide test was positive in blood and cerebrospinal fluid. This case improved and, on discharge from the Army a month after onset of the illness, he was able to walk. The other case complained of weakness in the right arm for an unknown length of time. On examination he was found to have a weakness of the right lower face, a flaccid weakness of the right arm and a slight spastic weakness of the right leg. The tendon reflexes were diminished in the right arm, the abdominal reflexes were absent on the right side. The right knee and ankle jerks were exaggerated and there was ankle clonus on the right side. There were 20 lymphocytes in the spinal fluid and the Ide test was positive both in spinal fluid and blood. The fourth case was of a Hausa soldier with malaria who was found on routine examination to have classical Argyll Robertson pupils. No member of the Colonial Service whom I met had seen a case of this description in an African. The fifth case presented with primary optic atrophy and the sixth had a widely dilated left pupil not reacting to light or convergence with a lower motor neurone facial weakness on the same side. This last case also had positive Ide tests in the blood and spinal fluid, which contained 9 lymphocytes per c.mm. His neurological condition was discovered on routine examination. The case discovered at post-mortem showed thickening of milky-coloured leptomeninges which were adherent to a brain covered with gummy exudate. There was moderate cortical atrophy and slight hydrocephalus.

There were 13 cases of leprosy. Recruiting officers were always very much on the watch for cases of this disease, consequently only one case with neurological signs was seen and he presented with a left ulnar nerve palsy, the nerve being palpably thickened both at the elbow and in the forearm. The other 12 cases were all of the maculo-anæsthetic variety. Diagnosis was not usually difficult but the demonstration of the causal organism either in nasal smears or in fluid squeezed from the cutaneous lesions after these had been incised was only achieved in 3 cases. The latter investigation, in which an incision is made into the skin lesion and scrapings taken from the margins, provided a truly reliable test for analgesia in the lesions.

Four cases of polyneuritis were seen. They all occurred in Sierra Leone, 2 in soldiers and 2 in civilians, 1 a woman. The soldiers were both Nigerians who, on leaving their own country, were forced by circumstances to change from a varied well-balanced diet to one which was certainly neither varied nor of a high vitamin or protein content. Two of the cases were moderate and 2 were severe. They all showed a classical picture of polyneuritis with marked or advanced wasting of all muscles of the limbs, gross weakness, ataxia and inco-ordination. Tendon reflexes were absent in both arms and legs, the muscles were acutely tender and there was gross impairment of all forms of sensation in the limbs. Besides the neurological signs all 4 cases showed evidence of vitamin deficiency with photophobia, cheilitis, glossitis and scalliness of the skin over the scrotum, knees and extensor surfaces of the elbows. There was no opportunity of observing the effects of treatment.

Bell's palsy was not uncommon. Five cases were seen. A sixth case which presented with what was apparently a Bell's palsy proved a diagnostic stumbling block.

Case 3.—The patient was admitted with a seven days' history of sudden onset of weakness of the right face. On examination he was found to have a right sided lower motor neurone facial palsy. No other neurological signs were found. He was returned to his unit to light duties after eight days in hospital. Eleven days later he was returned to the C.C.S. by his R.M.O. who had noted that the patient did not look well, the man having continued on light duties without complaint. On re-examination he was found to be an ill-looking man, complaining of headache and neck stiffness, with some dizziness and deafness in the right ear. He was lethargic and apathetic, there was marked neck rigidity with a weakly positive Kernig's sign on both sides. The right corneal reflex was absent and there was diminished sensation over the cutaneous distribution of the right 5th cranial nerve. His right facial palsy was unchanged. He had some dysarthria but no dysphasia. All his limbs showed

some reduction of tone, equal on both sides. His gait was staggering and he tended to veer to the right. His tendon reflexes were present and equal; the right lower abdominal reflex was absent. The plantar responses were absent. Lumbar puncture showed a turbid yellowish fluid under normal pressure forming a cobweb clot on standing. The protein content was increased and there were 633 cells per c.mm., 64 per cent of them lymphocytes. Examination of the fluid for organisms, including acid-fast bacilli, was negative. The Ide test was positive in blood and C.S.F. Within three days of admission he developed a bulbar palsy and was unable to swallow or speak, the gag reflex being absent. Coarse nystagmus appeared at rest and the meningeal signs became more pronounced. He became rapidly dehydrated and wasted. Fourteen days after admission the meningeal signs began to pass off but he now showed signs of involvement of 5th, 7th, 8th, 9th, and 10th cranial nerves on the right and 5th, 7th, 9th and 10th cranial nerves on the left. The tendon reflexes were increased on the left side and the abdominal reflexes were not obtained. Corneal ulcers developed on both sides. Repeated lumbar puncture showed the cell count of the fluid rising from 633 per c.mm. to 1,226 per c.mm. three days after admission and falling steadily to 196 cells per c.mm. on the day before death three weeks after re-admission. The percentage of lymphocytes gradually decreased and, at the last lumbar puncture on the day before death, he had 51 per cent lymphocytes in a cell count of 196. Repeated examination failed to disclose the presence of any organisms. Shortly before death he developed a typical soft sore on his penis. At post-mortem examination two small abscesses were found in the upper pons, one on the right and one on the left, and both presenting on the anterior aspect of the brain-stem. They were almost exactly symmetrical, the diameter of the one on the left being 1.5 cm. and of that on the right 1.25 cm. Anteriorly both abscess cavities were bounded by thickened leptomeninges, posteriorly by brain substance. No focus of infection either in the skull or in the rest of the body was discovered from which the abscesses might have originated. Examination of the smears of the pus from the abscesses showed a very few Gram-positive cocci and degenerate pus cells. Microscopical examination showed changes characteristic of pyogenic abscess.

Eight cases of herpes zoster were seen, including 1 of the geniculate ganglion. This latter case did not develop a facial palsy.

Disorders of vision due to refractive errors were fairly common but they have not been included in this series. There were, however, 6 cases showing organic changes in the optic discs or retina. Four of these were cases of degenerative choroido-retinitis and 2 were of papillœdema. The choroido-retinitis was probably syphilitic in each case. Both cases of papillœdema had malignant hypertension, the diagnosis being confirmed by post-mortem examination. One of these cases was interesting from the general medical point of view in that he presented with pain in the right iliac fossa. Routine examination of the discs, blood-pressure and urine indicated the correct diagnosis and, at post-mortem examination, he was found to have numerous subperitoneal hæmorrhages over the terminal 18 inches of the ileum.

Of other diseases of the C.N.S. there were 2 cases of transverse myelitis and 1 each of syringomyelia, motor neurone disease and congenital monoplegia. The cases of transverse myelitis were of the acute type, occurring at the level of the 1st lumbar segment of the cord. Both cases were seen about three months after onset of symptoms and both had been left with signs of a transverse lesion at the 1st lumbar segment. X-ray of the spine and examination of the C.S.F. were negative in each case. The case of motor neurone disease was one of amyotrophic lateral sclerosis. There were 11 cases of epilepsy and allied disorders. One case of the Adie-Holmes syndrome was seen.

After injuries psychoneurosis formed the largest group of cases. Twenty-eight cases of hysteria were seen. The chief presenting symptoms were paralysis, amblyopia, deafness, dumbness, fits, bizarre tremors, hypersomnia and hysterical sensory loss. Treatment of these cases was not difficult. The literate Southerners reacted well to pentothal hypnosis whilst the illiterate Hausas responded dramatically to injections of sterile water. The cases of hypersomnia were the most difficult for the unit was working in an area where trypanosomiasis was not unknown. No cases of this disease were seen amongst military personnel, although aspiration was carried out in all cases found to have enlarged cervical glands, the

fluid being examined for trypanosomes. Wet blood films were taken in all cases of hypersomnia but no trypanosomes were ever seen. No cases of anxiety state or depression were met with.

SUMMARY.

A description is given of cases of neurological interest seen during a tour of duty in West Africa.

Observations are made on the reaction of Africans to head injuries and also on the rapid way in which they recover from attacks of cerebrospinal meningitis.

My thanks are due to Air Vice Marshal C. P. Symonds, R.A.F.V.R., and Brigadier Hugh Cairns for their help and encouragement in the writing of this paper.

SOME OBSERVATIONS ON GYNÆCOLOGY AND OBSTETRICS IN NIGERIA.

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INTRODUCTION.

THESE observations are the result of an eighteen months' tour in Nigeria, West Africa, of which half the time was spent in the Southern Coastal Capital of Lagos, and the other half in one of the largest northern towns—Kaduna. The publication has a twofold aim. Firstly, it is thought that the contrasting gynæcological and obstetrical problems may be of interest to many and, secondly, it may stimulate some of those who are already in the West African Medical Service or who may be going into it to study more closely one or other of the problems raised and, I hope, to contradict some of the dogmatic statements made. In no way is the publication intended as a scientific analysis of the many and varied subjects discussed although a few figures and percentages are quoted to uphold certain statements.

Brief mention must be made of the conditions under which these observations were made. In short, it can be said that these were ideal and that the courtesy and facilities placed at my disposal and the equipment available were nothing short of miraculous. For example, the subject most closely studied was some 200 cases of sterility. For this I had at my disposal a separate examination room with a most excellent gynæcological couch and a well-trained nurse in attendance at any time that was desired. The pathologists appeared to welcome innumerable cervical and urethral smears, Ide tests, seminal examinations and sections of any pathological specimens obtained. In Lagos, there was even the most excellent pathological photographic department. Apparatus for tubal insufflation and endometrial biopsy was available and, although lipiodol hystero-graphy could be done in special cases, wartime restrictions on X-ray plates cut this procedure to the bare minimum.

These notes are based on approximately 2,000 gynæcological and 400 obstetrical cases seen. The figure is small and I am fully aware that many observations made are not in agreement with those who have had more experience. Particularly am I aware of the dangerous ground on which I tread when I give my views on tribal customs, &c. Unfortunately, there is practically no literature available on the gynæcological and obstetrical conditions found in West Africans and this paper is submitted in the hope that it may produce better and more scientifically observant literature on the subject from others. Certainly I can think of nowhere in the world which is more open to research.

GONORRHOEA.

The cases seen in the out-patients clinics and gynæcological wards in Nigeria present many differences from those commonly seen in this country. In the former, the greatest gynæcological problem is gonorrhœa, its complications and sequelæ. To give some idea of its prevalence, the following figures may be quoted :—

(i) In a native military unit of 250 men, approximately 30 per cent attended with acute gonorrhœa over a period of twelve months. This figure is, no doubt, higher than among the civilian population who are settled with their wives.

(ii) In the South, taking routine cervical smears from 100 cases of sterility, gonococci were demonstrated in 16 cases ; in 46 other cases a pathological vaginal discharge containing pus cells was present.

(iii) In the North, out of 85 cases examined, only 2 had proved gonorrhœa but the number with a pathological vaginal discharge was comparable with that found in the South.

Taking these and other factors into consideration, I am of the opinion that, in the South,

about 80 per cent of the African population in Nigeria has had gonorrhœa before the age of 20, and that, in the North, the figure is not far short of it. Certain prejudices, tribal customs, etc., are partly responsible for this. For instance,

(1) The belief that intercourse with a virgin will cure the disease is strong—as indeed this belief is not unknown here. In the last five months, 6 cases of acute gonorrhœa in girls between the ages of 8 to 12 years were seen—all prepubertal and acquired by intercourse.

(2) The belief has been expressed to me on several occasions that it is impossible to have children unless gonorrhœa has been acquired.

(3) Roughly speaking, wives are paid for in numbers according to the wealth of the husband and, at any rate in the Ibo tribe, a man is not allowed to live with his wife for two years after the birth of a child. Thus a young man who cannot afford more than one wife often acquires gonorrhœa during this period.

Although education and the Medical Services are gradually improving this state of affairs, it will be seen that many Africans do not look upon gonorrhœa as a disease and certainly there is little of the stigma attached to it which there is at home. A naive obituary notice in a Sierra Leone newspaper will illustrate this attitude. The deceased was an African missionary "who in spite of being a martyr to gonorrhœa for many years continued in his work as a missionary to the end."

There are many differences between gonorrhœa as encountered in Africans and at home. The infection is very much milder and, except in conjunction with complications, no febrile reaction has been seen. The number of cases of salpingitis, pyosalpinx, and tubo-ovarian abscesses is large. No less than 20 out of 100 cases of sterility in the South showed clinical findings of one or other of these conditions. In both South and North, of 60 cases tested for tubal patency and showing no clinical evidence of tubal disease about 50 per cent were found to be non-patent. And yet, in spite of these figures, no case of ectopic tubal gestation was seen and I only heard of one case operated on for the condition. This strongly suggests that the theory that adhesions and tubal inflammation are factors in the ætiology of this disease is false.

Tubo-ovarian abscesses are often of great size and five, ranging in size from a grapefruit to a melon, have been removed or drained. In some 35 of abdominal sections, a pelvis free from adhesions or inflammation has not been seen, with the exception of the girl with the imperforate vagina (Case 3). Bartholinitis is exceptionally rare, only two cases being seen and both of these in the last month. On the other hand, vaginal adhesions, which I think are due to prepubertal gonorrhœa, of almost (but never quite) complete vaginal atresia were seen. In all, the upper end of the vagina was affected.

Case 1.—A woman, well advanced in labour, was referred from Massey St. Dispensary to the African Hospital, Lagos, because, on vaginal examination, the cervix could not be felt. On speculum examination in the theatre an opening, which would just admit the point of a probe, was located in the upper right hand corner of the vagina. The introduction of one finger was therefore done. At operation the cervix was found to be half dilated.

These cases of vaginal adhesion in no way resemble congenital vaginal atresia in which a hard cartilaginous ring can be felt at various vaginal levels. In three other cases, partial adhesion of the labia minora was seen.

Case 2.—Gonorrhœa with sulphapyridine anuria. African girl, aged 13, admitted with acute gonorrhœa. Thick yellowish white discharge, associated with urethritis and vulvitis. Smear—numerous pus cells with intracellular G.C. Started on M & B 693, tabs 4 stat, and tabs 2 four-hourly. (The usual custom was to give 1 gram of the tablets suspended in sterile water intramuscularly for four days—this procedure was found to be not only very economical but, with the associated pyrexia of 102°–104° F., usually gave a certain cure). The local condition rapidly improved but, on the fourth day, the patient apologetically announced that she had a pain in the left loin and had not passed urine for three days—was that all right? She had a tense cystic swelling in the left loin the size of a melon and a blood urea of 240 mgm. per cent. At cystoscopy the right ureteric orifice could not be seen; the left appeared normal. There was no urine in the bladder. A ureteric catheter was passed up the left ureter and, very soon,

a snake-like blood cast of the ureter appeared alongside the catheter. About $\frac{1}{2}$ inch of this extruded itself into the bladder every ten seconds and, after about 9 inches, urine poured freely down the ureteric catheter. This was left in situ for twenty-four hours during which time $14\frac{1}{2}$ pints of urine drained. Fluid output satisfactory for the next three days and blood urea reduced to 60 mgm. per cent. Unfortunately, just when further renal investigations were going to be done, the patient got tired of hospital and "went for bush." There is little doubt that some interesting congenital abnormality of the renal tract would have been found.

OTHER VENEREAL DISEASES.

Other venereal diseases such as syphilis, soft sores, buboes and lymphogranuloma inguinale are comparatively common. In the North, the Ide test (which is used in place of the Wassermann and Kahn Tests) shows that about a third of all cases admitted to hospital are positive. The significance of this is obscured by the fact that yaws among other diseases gives a positive reaction.

Lymphogranuloma inguinale in women often affects the posterior vaginal wall and rectum. In two cases spontaneous recto-vaginal fistulae developed. A hard brawny mass is formed and not infrequently rectal strictures ensue. It is said by some to respond to sulphonamides, antimony, etc., but, in my limited experience, nothing would seem to make much difference when it affects the rectum and vagina and they are some of the most difficult and disheartening cases to deal with. A permanent colostomy is probably the surgical treatment of choice but is eminently unsatisfactory in Africans. Gradual dilatation appears to be useless and in the one case in which dilatation was performed under anaesthesia the patient died a few days later from peritonitis.

There is another (?) venereal disease in African women which is quite common in the North. It is an acute vaginitis associated with multiple small superficial ulcers on the vaginal mucosa and not infrequently extending on to the vulva. The ulcers are very painful and bleed easily on being touched. A Graff stain smear shows spirochaetes morphologically indistinguishable from those found in ulcerative gingivitis. About 24 of these have been observed, the majority occurring in minor epidemic form during a two months period when "Vincent's vagina" became clearly recognized as a clinical entity. The cases respond well to intravenous N.A.B. and stovarsol vaginal insufflations, the average stay in hospital being seven to ten days. The condition is mentioned in some textbooks but I have never seen a case at home. No similar lesions have been observed in men and, unfortunately, none of the husbands of infected cases were examined. It is not, therefore, known if they are of venereal origin.

DISORDERS OF MENSTRUATION.

Dysmenorrhœa is a common complaint, being a symptom in no less than 60 out of 100 cases of sterility. Of these it was estimated that 36 were cases of congestive dysmenorrhœa. Of the 24 not classified as congestive, 2 were proved at exploratory laparotomy to be due to endometriosis and it was suspected that several others were of this origin. The bulk of the remainder were spasmodic dysmenorrhœa, in most cases due to clinically demonstrable underdevelopment of the genitalia, as will be considered more fully later.

Menstruation in the African is popularly thought to occur at an early age but, from the questionnaire of 42 cases of sterility, who confidently stated that they knew the age at which menstruation started it was surprising to find that the average age was 15. No less than 13 stated that menstruation had started at 16 or over. But, taken as a general average of the population, I think these figures are misleading because (i) the cases were those of sterility in which menstrual dysfunction is to be expected; (ii) the histories given are very unreliable; (iii) it is a common sight to see girls who certainly do not look more than eight or ten with breast development.

Three cases of primary amenorrhœa were encountered. One was a woman of 35 who weighed 17 stones. Mentally she was very alert and showed no other stigmata of endocrine disorder beyond the excess of weight and her genitals. The vagina admitted only one finger,

was 2 inches long and at the vault was a minute cervix. The uterus could not be felt (? obesity). She was given a course of stilboestrol and, although no clinical benefit can honestly be claimed, she insisted that it was doing her so much good that she continued to take the tablets to my knowledge for four months. In another case, nothing was found beyond uterine hypoplasia.

Case 3.—A woman aged 18/20 gave the history that she had never menstruated, had very recently been married and dowry money of some £30 had been paid to her father. Her husband was going to take her to law and claim back the money. Her mental condition was utterly pathetic. On examination she was a well-built girl, rather stout. The skin was thick and there was other clinical evidence of hypothyroidism. The breasts were large. Abdomen : N.A.D. except very scanty pubic hair. There was complete atresia of the vagina and under-development of the labia especially posteriorly. P.R.—no uterus or adnexæ felt. It was decided to perform McIndoe's vaginal plastic operation after exploratory laparotomy. When the abdomen was opened a complete bicornuate uterus was found, each horn about a finger in width and 4 inches long (including tube). The ovaries appeared to be fully developed but the cervix was represented only by a small fibrous nodule. No vagina could be identified abdominally. With the abdomen still open, the patient was placed in the lithotomy position. Two silkworm sutures were then passed on long straight needles from the vaginal dimple until they were seen abdominally at the cervix. The abdomen was closed and ten days later the vaginal operation was undertaken. After following the silkworm guides for 3-4 inches a bicollate vagina about $2\frac{1}{2}$ inches long was encountered. The septum between was divided and a vaginal dilator the size of a large Ferguson's speculum was left in situ, comfortably accommodated. Unfortunately, I moved about fourteen days after this operation, when everything was going according to plan. The change in her mental condition was fairly remarkable when she was informed that there was a good chance of the operation being successful. Unfortunately this was not to be the case as I was informed that considerable contracture had supervened. Ten months later every effort was made to find her for examination but unfortunately the envoys could not convince her that it was not a trick to get some money from her.

In another case who menstruated, two separate and equal cervixes were seen at the vaginal vault. She failed to turn up for hystero-graphy. Apart from these examples of gross abnormality of development, many other minor abnormalities were seen and I have heard of many other gross and interesting abnormalities. There is no doubt that these are much more common in Africans than in Europeans. Mytrophathia hæmorrhagica, polymenorrhœa, etc., are extremely rare.

OTHER GYNÆCOLOGICAL CONDITIONS.

On the other side of the balance sheet there are many gynæcological conditions which fill the out-patient clinics and wards at home, yet which were rarely or never encountered in Nigeria.

Vaginismus has not been encountered and in every case complaining of dyspareunia there has been sufficient cause found. Kraurosis vulvæ, pruritis and leukoplakia were not seen. It seems almost incredible but not a single case presenting any of the numerous symptoms or signs associated with the menopause sought treatment.

Only one case of carcinoma of the cervix was encountered—carcinoma of all types is rare and cannot be fully accounted for by the fact that Africans die at a comparatively early age. The chronic cervicitis—backache syndrome—was not seen in spite of the frequency of gonorrhœa.

Four cases were diagnosed as fibromyoma of the uterus but, in the one case in which the patient was willing to undergo operation, this proved to be a painless tubo-ovarian abscess adherent to the fundus of the uterus.

There has been only one case of ovarian cyst (of any size). Even this was unusual, for it was a right-sided bilocular cyst, one locule containing about $1\frac{1}{2}$ gallons of slate-grey fluid and the other $\frac{3}{4}$ gallon of darker fluid. In addition she had a dermoid cyst the size of a small melon in the left ovary and a pyosalpinx on the right the size of an orange.

Prolapse of the genital organs is very rare. The only two cases causing symptoms meriting

surgical interference were both complete prolapses of the uterus and both giving a clear history of the prolapse dating from the day of delivery. I believe this is due to the custom of the women getting on to their feet soon after delivery and naturally having to use their pelvic muscles from the start.

OBSTETRICS.

The striking factor about obstetrics, in the North at any rate, is the rarity of any obstetric emergency or serious complication. I am not competent to speak of the South. There has been only one case of forceps delivery and two of prearranged Cæsarean section. One of the latter had had seven previous births, all long labours and all ending in stillbirth or neonatal death within a few days of delivery. Her diagonal conjugate was $3\frac{1}{2}$ inches. The other was a flattened pelvis who had a trial labour. Two other Cæsarean section operations were performed in the South, one the case of vaginal atresia already mentioned and the other a case of contracted pelvis. Only one case of placenta prævia was seen—of the third degree—and she delivered spontaneously a stillborn child after rupture of the membranes. Severe puerperal sepsis has not been seen. This is because the hæmolytic streptococcus is, for practical purposes, unknown in Nigeria. Mild pyrexia with slightly offensive discharge is occasionally seen.

In spite of the rapid growth of antenatal clinics and hospital obstetrics, the vast majority of African women still have no medical obstetric attention. It is surprising the rarity with which emergencies are admitted but there is no knowledge of how many women die in the "bush" from native medicine. On the rare occasions when they are brought in from the bush their condition is usually perilous. Two such cases may be quoted. One was a case of twin delivery—the first child was born spontaneously and the mother was brought in many hours later with the arm of the second child prolapsed. After delivery she developed an enormous vesico-vaginal fistula which was undoubtedly due to prolonged pressure. The large number of vesico-vaginal fistulae seen are mostly due to native "medicine." The other was a case of persistent occipitoposterior position and in this the chief treatment appears to have been to fill the vagina with cow dung. After cleansing and rotation she spontaneously delivered a live child and had a normal puerperium.

During labour no form of analgesia or anæsthesia is asked for or given. It is rare to hear more than the grunts of bearing down. Tears are uncommon and never serious in extent. The patient is officially allowed up on the second day and goes home on the third to sixth day according to the bed state or, as like as not, her own will. Two cases of foetal abnormality have been encountered and one case of hydatidiform mole. Abortions occur at approximately the same rate as at home.

The type of pelvis encountered is undoubtedly more inclined towards the anthropoid as opposed to the usual gynæcoid seen in Britain. The normal measurements are on the average in the region of 8 inches interspinous, 9 inches intercrystal and 7 inches external conjugate. There is marked difference of about 2 inches in the lateral diameters whereas the antero-posterior diameter differs by only $\frac{1}{2}$ an inch. Also the external appearance of the patient is commonly anthropoid although it must be admitted that this appearance is as frequently android. However an internal type of android pelvis is very rarely palpated and the labour complications associated with this type of pelvis were never seen. As a result of the android pelvis, posterior presentations are commonly seen and several births occur of spontaneous delivery, face to pubis. Male distribution of pubic hair is undoubtedly commoner.

During the antenatal period the problems which commonly arise are different. Toxæmia of pregnancy is very uncommon. I understand from Dr. Ogle that this is not so in Lagos and, if albumin is found in the urine, it is more likely to be due to ankylostome anæmia while headaches are more commonly malarial. No case of accidental hæmorrhage has been seen. Vomiting of pregnancy is rare, but one case was sufficiently severe to merit admission to hospital, and indigestion during early pregnancy is not uncommon.

Pyelitis of pregnancy is not so common.

The uterus at full term rarely exceeds the equivalent of thirty-four to thirty-six weeks at home and the average weight of the children is $5\frac{1}{2}$ to 6 lb. at birth.

In spite of the universality of gonorrhœa not a single case of ophthalmia neonatorum has been seen which is indeed extraordinary in view of the large number of births outside the hospital where no prophylactic treatment is given. Gonococcal conjunctivitis in children from two to seven is, however, not uncommon.

Two cases of icterus neonatorum have been seen.

An interesting feature of which perhaps many are not aware is that all African babies are born white and it is not for several days that many of them can be distinguished from European infants. Presumably this is due to the fact that melanin pigment must be exposed to light rays before the dark colour appears.

The women (with one exception) were universally circumcised. I have read accounts where in other countries this so-called mutilating custom has caused very considerable degrees of obstetric difficulty and even disaster. This has not been encountered in Nigeria. Considering the young age at which the operation is performed in Ibos, it is indeed extraordinary what little mutilation it causes. Many cases have been seen of true circumcision of the clitoral prepuce, the organ being left intact. Occasionally, however, the labia minora are encroached upon to a varying degree and the rule is partial or complete clitorectomy.

There are many other interesting features concerning gynæcology and obstetrics in Nigeria which space does not permit of recording.

In conclusion, I should like to take this opportunity of thanking all members of the Nigerian Medical Service with whom I had the luck to come into contact, in particular Dr. Campion and Dr. Ogle, both of whom have gone out of their way to help me, and who have provided facilities for holding clinics at inconvenient hours so that the times would not interfere with military duties.

I am also indebted to the military authorities for permission to forward this paper for publication.

THE DIAGNOSTIC IMPORTANCE OF THE STOOLS IN THE DYSENTERIES.

BY CAPTAIN R. ALDIN, M.D., D.C.P., D.T.M.

WHEN a medical officer is treating a patient with enteritis in the tropics he should insist on an immediate preliminary pathological report on the fæces and should be in a position to appraise the laboratory findings. If he does not do this he may be in doubt as to the correct diagnosis during the time that may elapse before a complete laboratory diagnosis is made, thus failing to make full use of the laboratory services and denying himself a useful guide to treatment.

The pathologist, by the microscopic examination of the stools, may sometimes make a diagnosis in a few minutes and can nearly always give a useful preliminary report followed some days later by a report on the cultural findings. Where there are no laboratory facilities, the medical officer, by the daily naked-eye inspection of the stools, may sometimes make a fair guess at the diagnosis.

An example occurred recently in this hospital. The patient, a surgeon, developed an acute enteritis with a rise of temperature. A negative blood film made malaria unlikely but did not exclude the possibility. It was doubtful whether the illness was a specific dysentery, amœbic or bacillary, an enteritis due to food-poisoning, a dietetic indiscretion or perhaps the abdominal form of malaria. A direct examination of the fæces showed red blood cells, degenerate pus cells and almost no fæcal debris or bacteria. A tentative diagnosis of bacillary dysentery was made and the appropriate treatment started at once. The patient made a rapid recovery. Some days later a Newcastle strain of dysentery was isolated from the fæces.

Dysentery is an indefinite clinical term meaning the passage of blood and mucus in the stools; it is not always an acute illness, it may be sub-acute, transient or sub-clinical. In some forms of bacillary dysentery there may be neither blood nor mucus but only an enteritis.

The physician and pathologist should work in close collaboration. In bacillary dysentery sulphonamides are most effective if given in the first few days. To give such drugs in non-bacillary dysentery is foolish and dangerous. Emetine given to patients with bacillary dysentery undoubtedly increases the mortality (Findlay, 1942). Both preparations are useless in other forms of enteritis.

Manson-Bahr (1943) has for years taught the importance of cyto-diagnosis, that is, the study of the bowel exudate; but its significance is not generally recognized. As the matter is barely touched on in many textbooks the newcomer to the tropics is often unaware of its diagnostic significance.

The stools in the acute diarrhœas of the tropics fall into five main groups: (1) The bacillary exudate characteristic of bacillary dysentery; (2) the indefinite exudate; (3) the amœbic stool; (4) the specimen showing a parasite (other than *E. histolytica*), its ova or larvæ; (5) the negative stool.

(1) *The Bacillary Exudate*.—In acute Flexner dysentery, after the initial emptying of the bowel, the stools are watery, containing little or no fæcal matter. Shreds of what look like mucus but really are masses of degenerate pus cells are suspended in a brownish fluid often flecked with bright red blood. The stools may be composed almost entirely of whitish, tenacious, gelatinous mucus. They are usually more numerous, smaller in quantity and the blood tends to be brighter in colour than in *E. histolytica* infections. It is said that when the stools are semi-solid they tend to flop out when the bedpan is turned over.

Microscopically many pus cells are present; after the first day they become degenerate showing pyknotic changes, due probably to the toxins of the dysentery bacteria. The pus cells may be scattered but are more often in masses of closely packed cells.

Red blood cells are also seen. They tend to be scattered and not aggregated in rouleaux. (This depends in part, of course, on how the preparation is made.) The red blood cells are

for the most part "fresh," that is, they are not de hæmoglobinized or degenerate. Exclusive of the red blood cells 90 per cent of the cells are degenerate polymorphs. The remaining cells are shed epithelial cells, macrophages, mononuclears and occasionally eosinophiles. In the wet preparation it is almost impossible to recognize the last two types of cell. The macrophages are easily recognized as large mononuclear cells which contain ingested fæcal débris, fat globules and, rarely, red blood cells. They are said to be feebly motile but are never actively motile like *E. histolytica*.

In acute Shiga dysentery the stools resemble those of Flexner dysentery. The onset of the illness is not usually so sudden.

Acute or fulminating cases of Sonne dysentery are rare. The stools are watery, sometimes unstained with blood but containing mucus. Fæcal material and organisms are scanty but the picture is not so striking as in Flexner dysentery.

To sum up, in acute bacillary dysentery the stools are almost entirely composed of exudate, pus cells and red blood cells being suspended in a watery medium.

(2) *The Indefinite Exudate*.—After the first few days the pus cells decrease in number, degenerate changes are more marked, the red blood cells disappear and the macrophages increase; fæcal matter and the normal coliform organisms reappear. This is the indefinite exudate and is not unlike that of amœbic dysentery apart from the absence of vegetative and cystic *E. histolytica*. The common intestinal flagellates, *Lambia intestinalis*, *Chilomastix mesnili* and *Trichomonas hominis* are often seen. It would seem that they were driven from their normal habitat by the violence of the peristalsis.

(3) *The Amœbic Stool*.—In acute amœbic dysentery the stools are less numerous than in bacillary dysentery. Macroscopically they tend to be foul-smelling and bulky, containing much fæcal material intimately mixed with dark red blood and mucus. Occasionally the blood is bright red and on the surface of the stool, suggesting bleeding from hæmorrhoids. The stool is semi-solid and is said to stick to the bedpan. Microscopically vegetative amœbæ are present, usually in considerable numbers. The red blood cells tend to be in clusters; they are often "old," that is, de hæmoglobinized and "ghost-like." Macrophages and mononuclears are present but pus cells are relatively scanty. Fæcal debris and motile organisms are normal. Charcot-Leyden crystals are often present and if no amœbæ are seen the stools should be examined repeatedly for the parasite.

Sometimes the pathologist will report the presence of vegetative amœbæ but will note that none show ingested red blood cells. A diagnosis cannot be made on this finding alone and further examinations are necessary. The so-called "rounded-off" or "coiled-up" amœbæ may be seen. These terms are applied to amœbæ in the process of encystment. The change takes place in an hour or two after the stool has been voided and once this change has taken place the pathogenic *E. histolytica* cannot be differentiated from the harmless *E. coli*. Again a definite diagnosis cannot be made and the stools should be examined repeatedly. The sigmoidoscope should be used to obtain a direct smear or else a rectal swab may be tried. The clinician should remember the all-importance of ensuring that the specimen reaches the laboratory as soon as possible after it has been voided; diagnosis is possible while it is still warm but after an hour it may be valueless for the diagnosis of amœbic infection. Cysts are not usually present during the acute phase.

In some countries double infections of bacillary and amœbic dysentery are common. If *E. histolytica* is found the pathologist should send an immediate report but should also carry out the routine examination for dysentery bacteria.

(4) *The Stool showing a Parasite (other than E. histolytica), its Ova or Larvæ*.—The stools in bilharzial dysentery may resemble those of either bacillary or amœbic dysentery. The finding of the characteristic ova clinches the diagnosis. The possibility of a mixed infection must not be overlooked; bacillary dysentery commonly occurring as a terminal event.

An uncommon cause of enteritis simulating a mild dysentery is *Strongyloides stercoralis*. This parasite is widely distributed in the tropics and usually causes no symptoms. It is said, however, that it may cause an intractable diarrhœa. The presence of the parasite can be

shown by demonstrating the larvæ in the fæces. The therapeutic test may be useful in determining whether the parasite is the cause of the enteritis or merely an incidental finding. Gentian violet in full doses is a specific.

Giardia intestinalis is said to be a common parasite in the intestinal tracts of young children ; in England 37 per cent showing the parasite in the stools (Hoyle, 1943). This usually harmless parasite seems at times to take on pathogenic qualities, causing an infective and at times fatal enteritis in infants (Ormiston, *et al.*, 1942). It is listed as one of the rare causes of enteritis in adults. Microscopically the parasite is easily recognized. Unless it is found the diagnosis cannot be made. Treatment usually fails unless mepacrine, which is a specific, is given (Chopra *et al.*, 1938). Although the parasite is widely distributed in the tropics, 6 to 16 per cent of the inhabitants being infected (Manson-Bahr, 1940), it is found in only about 1 per cent of adults in West Africa.

Chilomastix mesnili is usually regarded as a harmless saprophyte of the bowel. It is said not to be uncommon in the stools of young children ; in England being found in about 6 per cent (Hoyle, 1943). In West Africa it is not infrequently seen in the stools of adults and can be distinguished microscopically from the commoner and non-pathogenic *Trichomonas hominis*.

An African soldier suffering from enteritis was recently admitted to this hospital. The fæces were swarming with *C. mesnili*, three of four parasites being seen in every high-power field. No other cause for the patient's dysenteric symptoms was found. Mepacrine was given without improvement ; the parasite still abounded in the stools. Stovarsol was then given. The enteritis cleared up quickly and the parasites disappeared immediately.

Another similar patient was also treated in the same way in this hospital. If stovarsol is a specific, as these two cases suggest, it might be used as a therapeutic test to determine whether the parasite is the cause of the enteritis or merely an incidental finding.

Balantidial dysentery is rare ; clinically the condition closely simulates amœbic dysentery. The diagnosis can only be made by finding the pathogen in the fæces.

(5) *The Negative Stool*.—Enteritis simulating mild dysentery due to unsuitable food is not uncommon in the tropics. In West Africa, yam, cassava and other cellulose-containing vegetables sometimes cause an enteritis in Europeans who are not accustomed to such a diet. An examination of the fæces may suggest a diagnosis.

A European serjeant was recently sent to the laboratory for stool examination. He stated that four days previously he had developed severe enteritis (twelve stools in ten hours) with griping pains. The diarrhœa continued the following day, the stools being watery but unstained with blood. When seen he was still having frequent motions and griping pains. Macroscopically the stools were well formed, free from blood and mucus but containing particles of undigested foodstuff. Microscopically no red blood cells, pus cells, macrophages, crystals, amœbæ, cysts or ova were seen. Motile organisms and faecal debris were normal. There were, however, numerous (fifteen in one high-power field) large vegetable cells about a hundred μ in diameter. With iodine they showed a marked starch reaction. They were thought to be from yam or cassava. The patient recovered quickly without any specific treatment. It was subsequently learnt that he had eaten peanuts and had had a meal of yam shortly before the onset of the enteritis. It must, however, be remembered that anything that causes a rapid passage of the intestinal contents may cause the appearance of undigested foodstuff in the fæces.

In the enteritis associated with food poisoning, that is infection with the *Salmonella* group, the fæces are poor in cellular elements, red blood cells are not often seen and, perhaps, most important, faecal debris and bacteria are present, in striking contrast to the stools in acute bacillary dysentery.

In West Africa enteritis is the symptom heralding the onset of an attack of subtertian (malignant) malaria in 10 per cent of cases (Hughes, and Bomford, 1944). It is usually a simple diarrhœa, six to sixteen stools being passed in the twenty-four hours. Macroscopically the stools are watery containing neither blood nor pus. Microscopically occasionally red

blood cells and pus cells are seen. In about 1 per cent of cases the presenting symptom is dysenteric. The patient may have as many as thirty motions in the twenty-four hours, the stools containing blood and mucus. Microscopically red blood cells and pus cells are seen, a picture suggestive of the indefinite exudate seen in the recovery stage of bacillary dysentery. Such findings in a malarious country would suggest the need for a blood examination; even if plasmodia are found the pathologist should not neglect the routine cultural examination of the faeces for it must not be forgotten that malaria may occur in a dysenteric patient or that dysentery may light up a latent malaria.

Very occasionally severe attacks of subtertian malaria may be complicated with a blood-stained discharge or intestinal hæmorrhage. The blood is very dark and is derived from petechial hæmorrhages in the intestinal mucosa.

The medical officer in the tropics is liable to develop a fixed idea that all dysenteric symptoms are due to acute infections. Several negative reports should suggest the need for a complete examination; many diseases such as neoplasm, idiopathic colitis and hæmorrhoids may simulate dysenteric symptoms.

It cannot be repeated too often that laboratory reports should always be interpreted in the light of the clinical findings; they are merely aids to diagnosis and not a final diagnosis. For example, intestinal flagellates are common in the stools, especially in the tropics, and are often numerous in dysenteric stools, but they are probably rarely the cause of the dysenteric symptoms.

SUMMARY.

An immediate microscopic examination of the faeces will often indicate the correct treatment at a time when it may be of most value. In some conditions such an examination will at once give a definite diagnosis—a diagnosis that cannot be made in any other way. In bacillary dysentery the stool is almost entirely composed of exudate while in amœbic dysentery it is a faecal specimen in which the exudate is scanty. In other types of dysentery the causal organism may be found. Negative reports are not without value.

I wish to thank Lieutenant-Colonel E. G. R. Grant, R.A.M.C., for permission to forward this paper, and Corporal E. K. Asima, W.A.A.M.C., for technical assistance.

- CHOPRA, R. N. *et al.* (1938). *Ind. med. Gaz.*, **74**, 458.
 FINDLAY, G. M. (1942). *West African Military med. Bull.*, **2**, 34.
 HOYLE, L. (1943). *Monthly Bull. E. P. H. L. Service*, **2**, 45.
 HUGHES, S. B., and BOMFORD, R. R. (1944). *Brit. med. J.*, **1**, 69.
 MANSON-BAHR, P. (1940). "Man. of Tropical Diseases."
Idem. (1943). *Trans. Roy. Soc. Trop. med. and Hyg.*, **46**, 279.
 ORMISTON, G. *et al.* (1942). *Brit. med. J.*, **2**, 151.

THE OPERATING TABLE USED AS A TRACTION INSTRUMENT FOR FRACTURES.

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To exert manual traction on a broken deformed limb is a natural and human impulse. It dates probably from the Stone Age and its practice reaches right down to the present day.

This simple and common-sense method is often successful but it has a high percentage of failures. Inadequate reduction predisposes to several disabilities: (1) Lengthened treatment because the granulation-producing surfaces are not properly opposed. Thus, though a broad stream of granulation tissue pours from each fractured surface, these streams abut on each other only partially, forming a thin bridge of union. When calcification occurs, it is of this thin bridge and we must wait a long time before weight bearing is allowable. Otherwise we run the risk of re-fracture—a frequent and depressing sequel to many months' treatment of shaft fractures which have been inadequately reduced. (2) Osteoarthritis of neighbouring joints, though a late sequel; is nevertheless not uncommon. It results from faulty direction of weight through the neighbouring joint surface. (3) Deformity and impaired function. These need no explanation.

It is easy to analyse the sources of failure with manual methods. Successful reduction involves traction and counter-traction. Moreover it necessitates that these two opposing forces shall be firmly applied to the ends of the limb. Traction should be in the correct plane and the surgeon should have his hands and mind free for precise accurate lateral moulding at the site of angulation.

Manual traction often falls far short of this high standard. Too often the surgeon is faced with fracture deformity produced by great forces; to reduce it, he and his assistants attempt the puny traction and counter-traction of their own arms and these weak forces are jerkily applied by their slipping hands. Their bodies are bent into queer attitudes, suitable to a tug-of-war but hardly calculated to apply force in the correct plane; the surgeon, at the height of this desperate athletic contest, is unfit, physically and mentally, for the nice application of lateral moulding at the precise site of the fracture.

In spite of all these difficulties, successful manual reduction may occur in a proportion of these difficult cases. Elated by his success, but rather exhausted by his efforts, the surgeon straightens up and rests for a while before applying the plaster splint. During this moment of relaxation deformity often occurs. It is revealed later in the subsequent X-ray. Blame may fall upon the unfortunate assistant who was deputed to hold the limb. But it is the method rather than the individual which is at fault.

Against all these faults of human traction, mechanical traction employs adequate power, continuously applied, in the correct plane, at fixed unslipping points; the surgeon is free to concentrate entirely on precise moulding of the fracture angle; the reduction is held accurately by the machine while an X-ray confirms the position and while the retaining plaster splint hardens.

Two forms of tibial traction apparatus are at present in use: Bohler's and Watson-Jones'. The first is too well known to need special description. It gives good results but there are two obvious faults—firstly traction is horizontal and thus there is slight liability to backward sag at the fracture site; secondly the popliteal space is flexed over a metal bar and as the tension is increased there is localized pressure on the popliteal artery. This has been known to cause arteriospasm and gangrene. Watson-Jones' apparatus [1] is free from these faults: it pulls vertically, the crook of the knee being seated comfortably in a padded rectangular metal splint. Occasionally, with a slanting lower fragment, it is desirable to vary the angle of traction and this is not possible with Watson-Jones' apparatus.

Both these methods need extra apparatus. Under conditions of military surgery this is not always available ; but almost any theatre possesses a mechanical operating table. No other apparatus is necessary ; but far from being a makeshift the method has one or two extra advantages which will become apparent from the description.

The principle of the method is very simple and can be at once appreciated by a glance at the photograph—the patient's whole body rests horizontally on the table and gives an absolutely fixed point for counter-traction. (Note how the counterstrain is spread over the whole body instead of being entirely concentrated on the popliteal space.) The limb end is fastened to a ring or bolt on the floor. In other methods the distal end of the limb is pulled away from the body. In this method the body is pulled away from the limb.

DETAILS OF METHOD.

The technique is, of course, used only on combined fractures of the tibia and fibula.

A Steinman's pin is passed through the os calcis and another through the tubercle of the tibia ; a stirrup is attached to the lower pin. The leg hangs from the knee downwards over

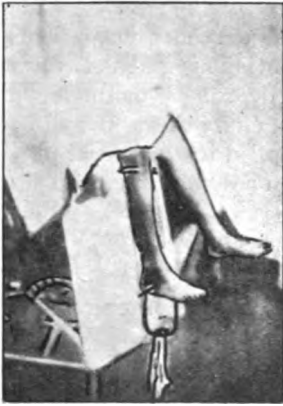


TABLE TRACTION.—Steinman's pins have been driven through the tubercle of the tibia and the os calcis. A stirrup is fastened to the latter pin and is tied to the ring on the floor. No spring balance is shown in this picture but its use is desirable. Traction has been made by turning the elevating wheel on the table. The tension should now be slackened, confirmatory X-rays taken and plaster of Paris applied.

the edge of the table and its stirrup is fastened to the ring in the floor. A spring balance is interposed between ring and stirrup (it does not show on the picture but we have since acquired it). The table is now elevated by pumping or turning the handle as the case may be. If necessary the angle of pull can be changed by using the tilting device only. Or a combination of tilting and elevating force may be used, as judged necessary for the particular fracture. No more than 30 lb. need be used though up to 50 lb. is permissible if necessary [3].

In a few seconds reduction is effortlessly accomplished and the tension should be slackened to 10 lb. or less. X-rays are now taken with a portable apparatus. The films should be examined carefully to see that there is no undue tension as manifested by a widened joint space.

The position of reduction is perpetuated by plaster slabs extending on each side between the two pins. The whole is now encased in plaster which is immediately split down the middle (on to a strip of orthopaedic felt previously laid along the tibia). The limb will almost certainly swell and the split caters for this, while yielding nothing in efficiency.

Special care is taken to enclose the ends of the pins completely in plaster. This prevents them slipping in and out ; thus the danger of infection is obviated.

When the plaster is practically dry the stirrup is disconnected. The patient is now "a mobile unit." Plaster should now be further applied up to the mid-thigh position with the knee slightly flexed.

DISCUSSION.

Gradual extension by weight and pulley apparatus—e.g. Bohler-Braun splint—was the most popular treatment for fractured tibia before the war. It was thought that, without continuous downward extension, the oblique tibial fracture would gradually slide up under the constant pull of the strong calf muscles. But as Watson-Jones shows [2] constant traction on the delicate uniting granulation tissues causes delayed union. Traction is necessary to reduce the fracture but, once reduced, it then needs merely *fixation*. I think that we have suffered from some confusion of thought in this matter; the following analogy may help; if we wish to raise a lift up its shaft, upward traction is produced by an electric motor. But, once the lift has risen to the top, we do not keep it there by the constant traction of the motor. It stays quietly fixed in its proper place by means of some static contrivance.

Thus the correct treatment for these fractures appears to necessitate the successive employment of two distinct principles—traction and fixation. Our former treatment by continuous weight extension was a confusion of these two principles; it delayed union though it did give improved alignment.

The war has curtailed our bed-space and has forced us to render our patients more mobile. These factors impelled us to abandon the method of continuous extension by weights. We have been driven to use methods such as this article describes—methods which are really better because there is the opportunity to give practical effect to the two different principles of traction and fixation. While the plaster is being applied it is essential to realize that the time for traction is finished; this is the time for fixation only and the tension must be slackened to the minimum necessary for holding.

SUMMARY.

- (1) Human traction is inadequate for the reduction of many fractures.
- (2) Inadequate reduction may result in delayed union, liability to refracture, deformity, impaired function and osteoarthritis.
- (3) Mechanical reduction has hitherto been available only by the use of special apparatus.
- (4) A method is described whereby mechanical traction can be efficiently practised by the use of the operating table as an instrument of traction. In this paper the method has been described when used for the reduction of tibio-fibular fractures. A technique has been devised for the fractured femur and it is hoped to describe this in a future paper.

REFERENCES.

- [1] WATSON-JONES, R. "Fractures and Joint Injuries," Livingstone, 2nd Edition; 1941.
- [2] *Idem. Ibid.*, Livingstone, 3rd Edition; 1943.
- [3] FARQUHARSON, E. L. "Illustrations of Surgical Treatment," Livingstone, 1939.

A STATISTICAL REVIEW WITH SOME CLINICAL AND THERAPEUTIC NOTES ON 554 CASES OPERATED ON BY A FIELD SURGICAL UNIT IN THE FORWARD AREA DURING THE TUNISIAN AND ITALIAN CAMPAIGNS.

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MUCH good advice and helpful comment has been passed to surgeons operating in the Forward Area by A.F.H.Q. Little so far has been put in print in a general way about this work and I do not think, therefore, that it would be out of place for me to present these 554 cases in the form of plain figures together with a few comments on each group of cases.

Statistics are notoriously deceptive and I would not claim that these are exceptional. Accurate compilation is difficult, mainly because wounds are so very frequently multiple (about 70 per cent) and therefore one case may appear under more than one heading and be recorded twice as either a recovery or a death. I have tried to avoid this as far as possible but, to take an example, a fractured long bone associated with an injured joint will appear under the heading of both joints and fractures. Abdomino-thoracic injuries are classed separately but, for statistical purposes, I have included them with the abdominal cases.

In 554 cases there were 55 deaths or 9.2 per cent. This is probably higher than the average and is due to the fact that my unit has usually been located with an M.D.S. and forward of the nearest Surgical Centre. Since the beginning of the Italian campaign, for example, 90 per cent of cases operated on have been urgent first priorities in which there is naturally a higher death-rate. This should not affect the death-rates for separate groups of cases, i.e. abdomens, chests, fractured femora, etc., but does affect the total percentage, as the latter figure is normally swollen by numbers of second and third priorities which have a low mortality rate.

The grouping of cases is copied with some minor modifications from the monthly pro forma returned by O.s C. F.S.U.s.

1. *Penetrating wounds of head.*

(a) *With dura mater intact.*

Cases	Operations	No operation	Evacuated	Died
10	9	1	8	2

All these cases were operated on for symptoms of rising intracranial pressure. The case not operated on was one of the deaths and I think I missed my chance when he was first admitted as the pulse fell rapidly from 50 to 35 and rose as rapidly to 140 when he died.

It is obviously better that these cases should be treated by neurosurgical specialists but, in North Africa at least, such expert help was often many miles, or rather two or three days, away from the case. In the European theatre of war, with shorter lines of communication and better roads, no doubt many such cases could be safely evacuated.

Varying quantities of intracranial blood were found but the main cause of compression was cerebral oedema and the pulses settled after wide decompression had been carried out. No attempt was made to find foreign bodies other than detached bone fragments lying near the surface in any cerebral cases.

(b) *With injury to dura mater and brain.*

Cases	Operations	No operation	Evacuated	Deaths
6	5	1	3	3

In most of these cases the injury was very severe and the ultimate result problematical.

2. *Wounds of spinal cord.*

Cases	Operations	Evacuated	Died
3	3	1	2

The case which survived was suffering excruciating pain from posterior foot compression as well as cord symptoms. Compression was produced by fragments of bone and laminae.

tomy completely relieved him of both cord symptoms and pain. He was evacuated from the Beach at Salerno on the fourth day. The two deaths were due to hæmorrhage, paraplegia and unrelievable shock.

3. Wounds of the chest. Without apparent lung involvement.

Cases	Operations	No operation	Evacuated	Died
46	35	11	39	7

Of the 7 deaths, 4 cases were multiple injuries and, in 2 of the remainder, there was penetration of both pleural cavities.

There seems to be some doubt still as to how sucking wounds should be treated. My own practice is to do a wide and careful excision of all damaged tissue, to impregnate the wound with sulphanilamide powder and to close completely the pleura with the intercostal muscles, the parietal muscles and the skin with interrupted sutures after securing most complete hæmostasis. It has nearly always been possible to keep these cases for some days at the M.D.S. and I have not yet seen such a wound break down though perhaps some have done so later. I shall remain optimistic about this method for the present, as anything less may well mean incomplete and temporary closure and reopening of the penetration during transit to the Base.

There were in addition 2 cases in which bleeding was also coming from disrupted lung tissue. Repair was not difficult through a good exposure and both cases did well.

I have unfortunately no reliable record of how many of these cases were aspirated and respirated after operation. Numbers were so treated as were also the 11 cases of non-sucking chest wounds. It is hard to believe that, if the chest has already been penetrated by a missile, the risk of sepsis would be further increased by the introduction of a needle, and the improvement in the patient's condition and comfort is frequently dramatic.

Pneumonia has been a complication though, not a fatal one, on more than one occasion and will have to be guarded against most carefully in the coming winter months. The response to oral sulphapyridine has been most satisfactory.

In the treatment of some of these cases I gained much valuable information from seeing the work of Lieutenant-Colonel d'Abreu at a General Hospital, B.N.A.F.

4. Penetrating wounds of the abdomen.

Cases	Operations	No operation	Evacuation	Died
59	56	3	37	22

Of the cases not operated on, 2 involved the kidney and 1 had a clean through and through wound of the liver; all three survived.

5. Penetrating abdomino-thoracic wounds.

Cases	Operations	No operation	Evacuation	Died
8	8	—	4	4

6. Penetrating abdominal or abdomino-thoracic wounds combined with :—

(a) Compound fractured humerus.

Cases	Operations	Evacuations	Died
3	3	3	—

(b) Compound fractured femur.

Cases	Operations	Evacuated	Died
4	4	2	2

Taking these three groups together the following organs were damaged: Liver 16 times; spleen 8 times (one not removed); kidney 10 times (2 not removed); stomach 3 times; jejunum 8 times with 40 perforations; ileum 12 times with 54 perforations; colon 22 times with 26 perforations; extra-peritoneal portion of the rectum 7 times; bladder 10 times; prostatic urethra 4 times, and three cases of retro-peritoneal hæmorrhage.

A different classification would of course be required to estimate the death-rate from the different organs affected.

The total number of cases under these three headings is 74 with 28 deaths, i.e. a 33 per cent mortality rate. This figure of 33 per cent is, I believe, low and can be attributed in a very large degree to the far-sighted policy of those authorities who have placed at least one

F.S.U. with the M.D.S., and the M.D.S. as far forward as possible. Time is the paramount factor and many of these cases I operated on within three to six hours of wounding and the heart-breaking experience of opening a pus-filled abdomen was happily exceptional.

A colostomy was carried out for nearly all large bowel injuries and all rectal injuries. A "precautionary valvular cæcostomy" was also sometimes performed when subperitoneal bruising of the colon was seen.

Gastric suction with a Ryles' Tube was instituted in all cases; aspiration being either by continuous syphonage or with a syringe every half-hour by one of my Nursing Orderlies. All cases had an intravenous drip glucose saline or 5 per cent glucose in water when available. I have found the latter solution more satisfactory when there is little loss of chlorides by vomiting or regurgitation from the stomach; diuresis is quicker and the relief of the most distressing thirst more rapid and effective.

In two cases repair of the kidney was possible but in the remainder either that organ was disrupted or the pedicle so damaged that nephrectomy was necessary.

In addition to the above cases I also opened 13 abdomens on a mistaken diagnosis of penetrating injury. One of these cases died but he had, in addition, a compression injury of the spinal cord.

The death-rate from the non-operative treatment of a perforated hollow viscus must be in the region of 100 per cent and when there is the slightest suspicion of such a lesion a small exploratory incision must be made.

Thoraco-abdominal surgery in the forward areas is, I think, one of the most fascinating branches of this work and the absolutely hopeless case does not exist.

7. Major flesh wounds. (70 per cent multiple).

Cases	Operations	No operation	Evacuations	Died
210	194	16	203	7

Of the deaths 2 were from gas gangrene and 5 from shock. Some of these cases had as many as 16 wounds and a number suffered from blast.

These wounds were of such infinite variety that it is impossible in this brief survey to comment on them except in a very general way. In passing, however, I would like to touch on this question of plugging wounds. This is a practice which is unanimously condemned and rightly so on account more particularly of the ever-present danger of anaerobic infection. But, occasionally, when there has been troublesome bleeding from the depths of a wound in a man in poor condition, and really as much in need of further resuscitation as operation, I have sometimes quickly powdered the wound with sulphanilamide and packed it tightly with dry gauze. The patient is then returned to bed, given a full therapeutic dose of A.G.G.S. and resuscitated with blood, plasma, hot water bottles, morphia, etc. Some hours later, when the general position is vastly improved, the man is brought back to the theatre and under a small dose of pentothal the pack is gently removed. I feel that this is the lesser of two risks and have not so far had cause to regret it. I do not know of any other excuse for packing a wound in the forward area.

On the question of careful conservation of all skin elements the merits of incision combined with limited excision and scrupulous attention to the relief of sub-fascial tension I will not enlarge. These matters have been fully dealt with by abler pens than mine. When time permitted most large flesh wounds have been encased in padded plaster before evacuation.

8. Fractures.

The following fractures either single or in combination with other lesions were also treated :

	Operations	No operation	Evacuation	Died
Scapula	4	—	3	1
Clavicle	3	—	3	—
Humerus	20	—	20	—
Radius and ulna	21	—	21	—
Wrist and hand ..	24	—	24	—
Pelvis	4	—	3	1
Femur	29	—	23	6
Tibia and/or fibula	28	1	26	3
Foot	7	1	8	—

One scapula injury died from gas gangrene and the pelvic fracture fatality was associated with abdominal lesions. Of the deaths among the fractured femurs, 1 was following secondary amputation for gas gangrene, 1 following amputation for dry gangrene due to associated injury to femoral vessels, 2 were fractures associated with abdominal injuries and 2 were from post-operative shock and possibly might have been averted.

Of the fatal tibio-fibula fractures 2 had suffered very severe hæmorrhage from the posterior tibial artery and 1 had gas gangrene.

The "Tobruk" Plaster and its individual modifications remains the unquestioned method of treatment of fractured femora and some below knee fractures in the forward area but I think too much has been made of the question and means of obtaining extension. As I see it the extension serves one purpose and one only; it ensures firm fixation of the ring of a Thomas splint up against the tuber ischii. Any attempt at the reduction of the fracture in the field is futile and unnecessary. The object of this plaster is to ensure the safe, painless and shockless transport of the patient to hospital where the proper classical methods of X-ray controlled extension, abduction, internal rotation, etc., may be instituted, and it has no other function. My own practice is to incorporate a wire loop in the below-knee casing and, after adjusting the ring to the ischial tuberosity, to fix the wire loop under a steady 'pull with a flannel bandage to the end of the Thomas splint. The flannel bandage is incorporated in plaster, no Spanish windlass is used and the "Tobruk" outside casing is completed.

For big penetrating wounds at the trochantric level of the femur I do not use a Thomas splint as the ring is liable to cause pain by pressure and movement over the wound; instead, a plaster spica is applied from the waist to the toes with the leg straight in line with the body, to facilitate transport by ambulance, and the unaffected leg free to flex for nursing purposes on the journey to the Base.

Dorsiflexion of the foot and 5° of flexion at the knee is observed in all cases and the latter is absolutely essential for fractures of the lower femoral third.

With regard to the fractured humerus, I tried to devise something less cumbersome than the round-the-thorax plaster but I failed by any method of strapping and flannel bandage to get adequate painless fixation and so have returned to the present standard method.

9. Wounds of Joints.

	Operations	No operation	Evacuation	Died
Shoulder	10	—	10	—
Elbow	7	—	7	—
(Wrist and hand included with fracture of this region).				
Hip	—	—	—	—
Knee	18	4	21	1
Ankles and foot ..	18	—	18	—

It is more than likely that some of the gross injuries to the upper end of the femur involved the hip-joint in some cases.

The 4 knee cases not operated on had clean through-and-through injuries and were seen by me for the first time many hours after wounding. I aspirated the hæmarthrosis only. All cases were fixed in flexion, for the journey back, by plaster of Paris from the middle of the femur to the toes. The death among the knee cases was due to shock in a man who had multiple injuries of both legs.

10. Nerve injuries.

Brachial plexus	1	Musculo-spinal nerve ..	9
Median nerve	11	Ulnar nerve	11
Posterior interosseus	1	Great sciatic nerve ..	—
External popliteal nerve	3		

All cases were operated on for the associated injuries and not for the nerve lesion and there were no deaths.

The above were cases of demonstrable nerve sections but there was a number of other cases of nerve concussion and paralysis from local injuries in which, at operation, the nerve if seen appeared macroscopically intact. Fixation in plaster of the affected groups of muscles, in a position of rest, is the same for both types of case.

It is of course an axiom that no attempt at immediate nerve anastomosis should be made in these cases but, if there was no risk of tension, that is, if there was not a section of the nerve actually shot away; then I loosely approximate the cut ends by a catgut stitch through the nerve sheath in the hope that this would be of some assistance to the neuro-surgeon in his later operations.

11. Amputations at all levels.

		Operations	Evacuation	Died
Arm	.. ..	8	8	-
Leg	.. ..	15	10	5

Of the 5 deaths 1 was due to shock and hæmorrhage; 2 to gas gangrene; and 2 had dry gangrene from vascular damage of the limb before operation.

I agree most emphatically with the opinion of Colonel Debenham, expressed in a recent *British Medical Journal*, that there is no such thing as a "site of election amputation" in the forward area. The amputation should be done as low down as possible having regard to skin flaps and blood-supply. An F.S.U. amputation should be a means only of getting rid of a grossly damaged and shock-producing limb. The aseptic amputation of prosthetic value is the work of those operating under ideal conditions. I have frequently carried out amputations through joints in shocked cases; the minimum of muscle surface is exposed and operative shock thereby greatly reduced; Novutox injection of large nerve trunks precedes their section.

12. Burns.

Operations	Evacuation	Died
23	19	4

By "operation" is meant the proper cleaning up of the burnt surface followed by "dyeing" with gentian violet and powdering with sulphanilamide powder, followed by vaseline gauze and sometimes by plaster splints. A palmer slab holding the hand in dorsiflexion is employed as a routine. Burns of all degrees of severity and extent are included and the majority were of such an order as to require considerable pre-operative resuscitation.

The four deaths resulted from two accidents occurring under identical circumstances namely the explosion of hydra burners which were being used in confined spaces. I did a postmortem on one of these cases and found second degree burning of the larynx and the whole of the bronchial tree. Death by drowning from exudate occurred in all four cases and was undoubtedly due to the inhalation of burning petrol vapour. There were no deaths from tank accidents. One remarkable case must be mentioned of a man taken from a burning tank and who had more than four-fifths of his body surface burnt, in many places 3rd and 4th degree. He was resuscitated by Captain Bostock for many hours and received no less than 11 pints of plasma; he finally reached the theatre with a good volume pulse and was evacuated in fine form five days later.

13. Wounds of neck.

There were 4 cases of wounds of the neck involving important structures; all were operated upon and duly evacuated. In 1 case the shell fragment had opened the pharynx and in addition torn a large hole through the larynx, disrupting the thyroid cartilage. After doing a low tracheotomy and a gastrostomy the wound was cleaned up and dressed in the usual way and the man evacuated by sea five days later.

14. Maxillo-facial injuries.

Cases	Operations	Evacuated	Died
16	16	14	2

Operation consisted of the minimum excision of obviously destroyed tissue and the loose approximation of huge flaps often seen when the face is disrupted. Every operation was done with the assistance of a dental officer of the Field Ambulance or C.C.S. to which my Unit was attached, who carried out the necessary wiring of alveolar teeth-bearing fragments. Both fatal cases had multiple injuries but one of them died from aspiration bronchial pneumonia and might possibly have been saved by tracheotomy done at operation on the face.

15. *Wounds of main vessels (Artery and/or Vein).*

	Cases	Operations	Evacuated	Died
Brachial	7	7	7	-
Femoral and popliteal	8	8	6	2
Anterior and post-tibial vessels	8	8	7	1
Common iliac vein	1	1	-	1

In those cases in which dry gangrene occurred, a line of demarcation becoming rapidly evident, amputation was not performed. After cleaning up the wound and applying a sterile dressing, the cases were evacuated for further treatment at the Base.

Sepsis is of course the great danger when injury occurs to main vessels and I think it likely that a proportion of these cases subsequently developed both aerobic and anaerobic infections.

16. *Wounds of the external genitalia* are included amongst the major flesh wounds.

17. *Eye Cases.*

Seven cases were encountered with nine eyes involved. Only one enucleation was immediately necessary and the other cases after gently washing out the conjunctivæ with warm saline were atropinized; two or three drops of castor oil were applied ten minutes later so as not to interfere with the atropinization and the patients were immediately evacuated.

18. *Gas gangrene.*

Cases	Operations	Evacuated	Died
12	12	7	5

The above were clinically definite cases of severe gas gangrene infection and, in a few of these, bacteriological confirmation was obtained. In the others such assistance was not immediately available.

The important clinical distinction between frank gas gangrene infection and the gas-forming sporogenous infections is usually fairly clear. The latter will show subcutaneous crepitus and a very low toxicity and, in the absence of other indications, amputation should not be resorted to as the condition clears up with the routine antiseptic and bacteriostatic treatment.

In obvious gas gangrene infections the giving of large doses of anti-sera by various routes does seem to diminish the toxæmia but I have not yet seen the progress of the disease in any way arrested by this means.

Information on this subject of much greater value is obtainable from units established on the L.s of C. and this applies also to the merits and demerits of the various bacteriostatic agents now in use.

In presenting this report, I would like to emphasize that my comments are only clinical and therapeutic notes which have occurred to me as I write and in no way an attempt to cover the huge and absorbing subject of surgery in the forward area.

A word about F.S.U. personnel. A F.S.U. is a team and not a man and its efficiency is an index of the capacity of every member of the unit. Two of my N.C.O.s, during a particularly busy period, quickly learned to cut down on the internal saphenous vein at the ankle under local anæsthesia and to set up an intravenous drip saline which eased the work for me enormously when an F.T.U. was not available. One of my Nursing Orderlies was "another pair of eyes and hands" for me in the post-operative ward. My R.A.S.C. drivers have been of the greatest help in rush times in the undressing, cleaning and preparing of patients for operation when we have been working on the "three table" principle, namely, one operation being finished during the induction of the second and while the third is being prepared for operation on a stretcher at the side.

I cannot conclude without grateful reference to my anæsthetist, Captain J. B. Wyman, R.A.M.C. Apart from his very high qualities as an anæsthetist his clinical judgment in difficult pre-operative problems has been of immense help to me on very many occasions.

EX AFRICA SEMPER ALIQUID NOVI.

BY LIEUTENANT-COLONEL G. C. DANSEY-BROWNING, D.O.M.S.,

Royal Army Medical Corps

AND

MAJOR E. C. ZORAB, D.O.M.S., M.B.,

Royal Army Medical Corps.

THIS is the outline of the stories of two improvisations which met after long and dusty pilgrimages in the fourth year of the war. They fused and from their fusion it is hoped that there has resulted the blue-print of a standard Mobile Ophthalmic Unit.

Study of any medical history of the last war shows that there is no reason to claim originality for the idea of such a unit. The theory was there. Bring the ophthalmologist up to the battle casualty and not the patient back to the specialist. To this end special electro-magnets and "magnet-cars" had been designed but the twenty years of peace had relegated these to the attics of Military Medicine.

M.E.F. UNITS.

Western Desert manœuvres in the uneasy years up to 1939 gave one of the authors a very good idea of what a North African L. of C. would entail. It was clear that if any attempt at early surgery was to be made the ophthalmic surgeon had to function at a Casualty Clearing Station; the first bottle-neck on the medical line of evacuation. Otherwise the chances of saving the functions of any eye, even only slightly injured, would be greatly prejudiced by the immense distances to the base hospitals.

So the winter of 1939-1940 saw the design of an "Ophthalmic Section Lorry" submitted. Later, as the author saw the casualties pass through his light field ambulance in Wavell's "push," he wondered if the scheme was still gathering dust in its file in Cairo.

But he was wrong for the powers-that-be altered and improved on the original scheme. More equipment was given it and, complete with a Rumanian trailer, the Mark I design set off for Tobruk.

It arrived just in time for the first siege. German bombs partly destroyed the vehicle and, after a short but exciting stay, the personnel and the remains of the unit were evacuated by sponge-fishing vessel to the Delta.

There for the moment the matter stood. But the summer of 1941 and the static period that followed on the failure of the small June offensive necessitated this officer going forward to deal with "eye cases" at Mersa Matruh. On his return it was decided that one ophthalmic unit at least was required forward to cope with the particular problems of the Western Desert. So a provisional War Establishment, his old scheme and the personnel of Mark I were handed him and he was told to produce results.

Mark II came to term in due course and arrived at Mersa Matruh in time for the November offensive. The composition of the unit at this time is worth indicating. A refracting-room had been constructed on a lorry, with a dental chair, as the basis of a minor-operating theatre. An electro-magnet and generator had been procured to enable major operations to be done at the C.C.S. November 24, 1941, nearly saw the premature end of this unit. German bomb fragments riddled the refracting room. But Mark II was able to continue its work with these honourable scars for some eighteen months longer.

The first part of Auchinlech's attack found the unit at the railhead C.C.S. and the battle casualties were plentiful and early. The rapid fluctuations in the front that followed apparently did not permit of the unit going forward; so the personnel settled down to long weary months of refracting and treating the ophthalmic sick.

There was not sufficient optical glass in the Middle East at that period to allow of the formation of Field Optical Sections. Once a man was refracted his prescription had to be sent by train to Cairo to be "made up." The spectacles then were forwarded by train to the man's unit; often arriving broken weeks or months later. In spite of the advertisements also it was found that the phenomena of night-blindness and glare assumed their correct position in the long list of complaints that the disrespectful called the "Sand-happy Syndrome."

Rommel's attack and the capture of Tobruk gave a month's hard work on battle casualties to the unit before it took a leading place in the "Handicap" back to El Alamein. Then the unit was pulled out to refit and sent to spend a most enjoyable busman's holiday testing the nocturnal visual acuity of gunners in Syria and Palestine.

The Eighth Army was now at Egypt's front-door and the full flood of its ophthalmic cases swamped the out-patient departments of the Cairo and Alexandria hospitals. Immediately the value of the desert step-child became obvious! The unit was torn from its Levantine flesh-pots and sent back to its rightful milieu of sand, flies and six hundred fresh cases a month.

But within a short time the whole picture changed. The battle of El Alamein gave its scores of ophthalmic casualties. Then followed the break-through and the long road to Tripoli with its heart-breaking daily mine casualties. Here too was laid the foundation of the team-work with the neuro-surgeons; the first of the other "small units" to make a sustained appearance in the field. Later a maxillo-facial unit arrived to add the finishing touches to what the authorities aptly described as the "Specialist Trinity."

The Army rested in Tripoli for a very short while. The unit worked frantically to rehabilitate them with captured German spectacles before the advance continued into Tunisia. After Medenin, with the unit in the right position to get the early casualties, orders suddenly arrived to hand over Mark II and set off to Cairo to design and build Mark III.

Before leaving, however, news had filtered through that there was a Mobile Ophthalmic Unit with the First Army. Mark II wondered if the two would ever meet and compare notes but, though subsequently Sousse was reached, this did not eventuate in Africa.

THE FIRST ARMY UNIT.

This portion of the story is given in rather more detail than that of the Desert Units. The reason is that this campaign took place in country that approximated more to Europe than it did to the Western Desert.

At the time of the North African landings there was still no finally approved War Establishment for a Mobile Ophthalmic Unit. So, although the second author had heard the views of the Consulting Ophthalmologist at Home, yet he had not the benefit of the Desert Unit's experience to work from. Neither had he anything to enlighten him as to the difficulties to be encountered.

From the start of the campaign the need for a Mobile Ophthalmic Unit became obvious. This was due to the urgent necessity for the early replacement of spectacles rather than for the immediate treatment of the battle casualty. So it was left to him to gather whatever he could obtain in the way of equipment and transport and form a unit that could function in that particular type of country. Although the distances to be covered were not large by Desert standards yet the roads were appalling, the railways scarcely functioned and postal facilities were, to say the least, haphazard. So if the spectacles of the soldier could be replaced within twenty-four hours there would be a tremendous saving both in manpower and in time wasted in travelling.

So he set about him and collected:—

(1) The largest available "four-wheel drive" truck to cross the local mud. A Bedford troop-carrier served his purpose admirably.

(2) A portable Refraction Outfit. This condensed into one large box everything that is necessary for the examination of the eye.

(3) A set of ophthalmic surgical instruments.

(4) A Serjeant Optician and a Field Optical Set. This set contained, in nine boxes, the materials and tools for the immediate production of many hundreds of pairs of spectacles.

The unit, complete within forty-eight hours of its inception, set out for the C.C.S.

Unfortunately this was sited sixty miles behind the line and proved too far back. Therefore it was decided to set up at Field Ambulance level and service each Division in turn.

There were several routes and lines of evacuation. In consequence it could not be arranged that all "Battle-Eyes" be routed to the one unit. So arrangements were made for the various C.C.S.s to call for the unit to operate on cases when necessary. In the beginning the casualties were few; by far the larger portion of the work, the least interesting but yet the most important, consisting of refractions and repair and replacement of lost or broken spectacles.

The Regimental Medical Officers were notified in advance of the location of the unit and the rest was left to them. Though some days enormous crowds would arrive yet it was always found possible to get through the work and return the men with their spectacles to their units before sundown. One particularly heavy day entailed the Serjeant Optician turning out seventy-two pairs of spectacles; no mean achievement on a hand-turned grindstone.

In this fashion some four British and one American Divisions were serviced; sometimes in the line, sometimes when "resting." Occasionally it became necessary to vacate the truck in a hurry and seek a convenient slit-trench whilst enemy aircraft passed over on their road-strâfes. But luckily no hits were registered.

For the final battle of Tunis the unit moved to Thibar. Situated there was a six hundred bedded hospital draining wounded from almost the whole of the British First Army Front. Numbers of eye casualties were admitted—largely mine wounds and mortar wounds.

Tunis captured, there was a short lull until the evacuation of the captured Axis hospitals was started. Most of the casualties from these hospitals had been untreated, although often a week or more old. They gave plenty of operative scope.

At this point the purely African portion of the story finishes. The First Army Unit and Mark II were in Tunisia and Mark III was being built in Cairo. It seemed extremely unlikely at that time that any further changes would be made before the impending assault on Europe.

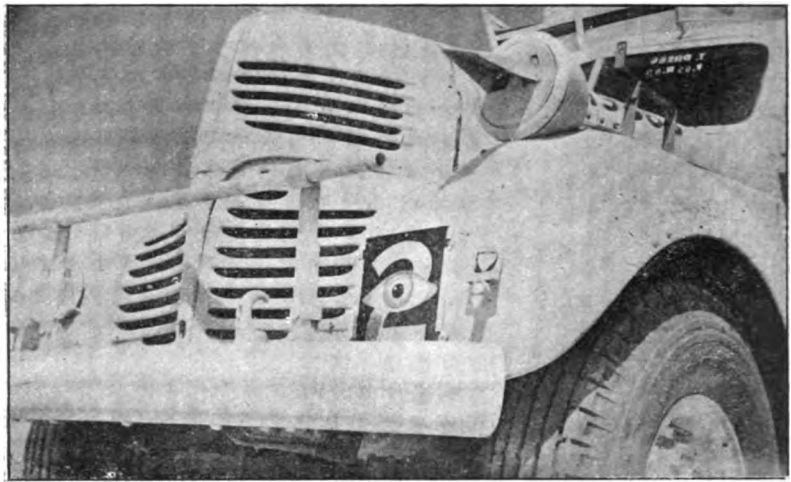
EUROPE.

In July, 1943, Mark III had replaced Mark II at Tripoli, when this old war-horse returned to the Delta to refit. The first Army Unit moved to Sousse to await the Sicilian attack. Both units were occupied on routine refraction work and only a few eye-cases resulted from the capture of Pantellaria.

The new vehicles of Mark III were on the scale of pantehnicons: one still being the Minor Theatre and Refracting Room while the other contained the "optician's shop" and generator. There was insufficient equipment for the major operation cases and still no anæsthetist. These vehicles were of such a size that low priority only could be obtained for the Mediterranean crossing.

So, the landings once started, the personnel of Mark III "wangled" their way aboard a Hospital Ship. A box of Surgical Instruments and only what equipment they could carry on their backs could be taken. However they had reckoned that in this form of "Civilized Warfare" there would be some provision of shelter or housing for medical units. In this they were correct and this "token Mark III" once more was able to function at its spiritual home—the "Bottle neck C.C.S."

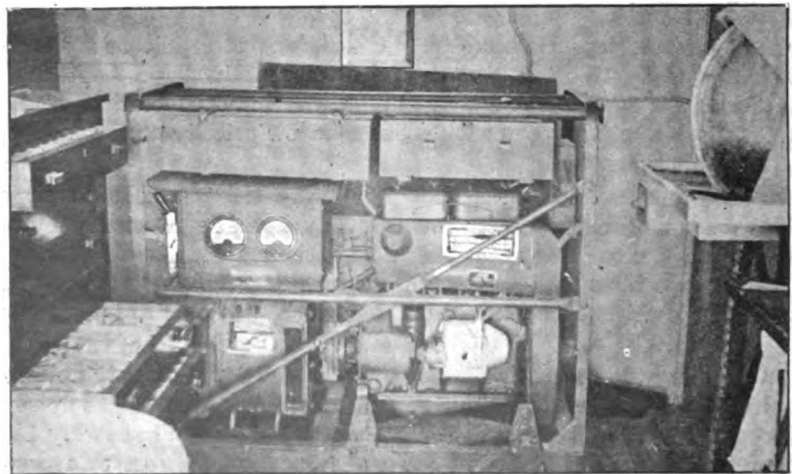
At first, of course, owing to their limited equipment, they were only able to care for the battle casualties. They operated, diligently instilled penicillin and sulphacetamide and evacuated cases by air or sea to North Africa. Meanwhile the First Army Unit acted as a "Rear Section" for Mark III firstly in Sousse, later moving across to a General Hospital



Mark III belonging to Eighth Army.



Mark III vehicles.



The opticians' shop, Mark III.

in Catania. Some of the cases came through direct to them but the majority had passed through Mark III.

As time went on lenses were acquired ; in fact enough to start two optical centres. So the personnel of Mark III set about teaching themselves, by trial and many errors, the art of the optician on a P.O.W. hand-driven grindstone. But fortunately their optician rejoined them before the very amateur quality of their " edging " became too well known.

Early September saw the trio from Mark III still " humping " their equipment as they stole a ride over the straits of Messina. They followed in the wake of the Eighth Army as it moved up the Calabrian coast to reinforce the Salerno bridgehead. Then they zigzagged across to the East Coast of Italy, like limpets, sticking to their bottle-neck C.C.S. The First Army Unit moved up to Taranto behind them and the advance sections of the other members of the Trinity caught up with them.

Then the powers-that-be decided to fuse the two units and at the same time laid down the policy of keeping all three specialist units together at one forward bottle-neck C.C.S. Mark III vehicles most amazingly arrived. A share of an anæsthetist was obtained and also equipment for the unit to work its own operating theatre in the C.C.S. One of the opticians and his mobile " shop " was sent on tour to act as an advanced repair depot whilst the other remained to deal with the unit's main commitments.

Thus, starting with the Trigno and Sangro river battles and the subsequent struggle for Ortona, there were available at the most forward C.C.S. full specialist facilities for dealing not only with all eye conditions but also through the willing co-operation of the other members of the " Trinity " with any other injury above the level of the cricoid cartilage.

The statistics of the two units are also of interest. Over a period of close on three years in the Desert it was found that some 21-22 per cent of all battle casualties passing through medical units had sustained ophthalmic injury. Of all fresh attendances at the unit some 10 per cent were battle casualties ; in Africa approximately 600 battle casualties. During the year up till February, 1944, the First Army Unit performed some 247 major operations and did some 6,500 refractions.

The original impression gained by the two ophthalmologists (who incidentally have known each other on and off for twenty years) was that the Desert Unit had been formed primarily to treat the casualty whilst the First Army Unit was designed to deal with the problem of the man without glasses. By now they have both found that, to justify the title of ophthalmic unit, the two jobs have to be tackled together and at once. From these experiments and from their pooled experiences has emerged the blue-print of a standard mobile ophthalmic unit ready for the Second Assault on Europe.

EX AFRICA SEMPER ALIQUID NOVI !!

SUMMARY.

- (1) Brief outlines are given of the histories of mobile ophthalmic units that have served with the First and Eighth Armies.
- (2) Their organization and method of functioning are given both with regard to the treatment of the battle casualty and the sick.
- (3) The fusion of the two units is described and suggestions for future modifications outlined.

As always, our thanks are due to each and everyone of the members of the units without whose loyal support and unflagging energy the job could never have been done.

Editorial.

A CRITIQUE OF THE NAZI CREEDS.

If the pronouncements of the Nazi leaders can be accepted as representing the political ambitions of the Third Reich, then we are justified in concluding that the aim of the Nazi party has been the complete political, economic and cultural domination of Europe, even of the whole World. To such domination we object and we are prepared to resist it with all our strength. If we interpret circumstances and events aright, then the Nazis had skilfully transformed the German people into an instrument of war to be used by them in the pursuit of their aims. By this we and all that we represent were threatened with extinction and, therefore, we were prepared to defend all that we are and have because we personally held the view that the contributions, actual and potential, which the Society of which we are members had made and could make to human and social betterment were infinitely greater and more enduring than those preferred by the Nazis.

Had we lived a hundred years ago we should not have been troubled so much by recent events in Germany for between this country and the continent of Europe there was then a wide deep sea, a barrier behind which we pursued our own quiet social evolution, disregarding disruption elsewhere. But developments in the physical sciences have been so vast and so rapid that distance no longer protects and the seas have dwindled in size to become mere ponds. This country is now part of the continuous land mass of the continent, a neighbour of Germany and, for this reason, since the political ambitions of the Nazis clash violently with those which have moulded the social structure of this country during the last forty years, this conflict became inevitable. This war could have been postponed but not avoided had we decided about 1935 to put an ocean between us and Germany by transplanting ourselves as a society, with all our treasured possessions, to Canada. This adventurous transplantation of a people with its traditions would have been feasible but we chose to stay in Europe and this made it quite certain that we should be involved in war in the immediate future, since it has always been quite obvious that we, as a people, have at no time been prepared to endure or even to share in this Nazi domination.

So it is that we were forced to be personally interested and to become involved in the political machinations of the Nazis. The eager acceptance of the Nazi doctrines by the German people and the degrading effect of this upon the intellectuals of that country had thoroughly frightened us and had made us angry, and we had come to realize that what had happened in Germany would surely happen here unless the Nazis were opposed.

The Nazis dreamed a dream of world dominion and clearly saw the ways in which they could make this dream come true. On gaining political power they at once began to forge the weapons of war, material and spiritual. Germany became an armed camp and the Germans were offered creeds tuned to their needs and temperament, creeds that would appeal to them and enlist their unrestrained loyalty to the cause with which their new leaders were identified. They gave to the German people just that which they lacked, a religion, a function in this world, a faith in the future; they elevated Hitler to the position of a god who promised a terrestrial heaven to those who served him, a hell for those who opposed; they invited the love of the people for a leader cloaked in mysticism; they directed the hate of the people against an artificially created but tangible enemy—the Jew. In doing these things the Nazis showed that they possess an astonishingly accurate knowledge of human frailty and of the modern techniques of applied psychology.

The Nazi leaders, it would seem, clearly recognizing that their objectives were not susceptible of rational formulation and that their appeal must be addressed to the intuitional and to the emotional, took steps to ensure that enlightened criticism should not hinder them.

To this end they deliberately and skilfully introduced two national policies, (1) anti-intellectualism, (2) wehrwissenschaft—the harnessing of all the country's energies to the chariot of war, the imprisonment of science within the sharp bounds of what is of military value, and the discouragement of all free scientific speculation.

Take the classroom of a free university, the work of which has not been disrupted by the war. In such a room the teacher says that which he chooses to think; his words have not been censored. The work that he does is the expression of his own personality and takes the form of attempts to advance the frontiers of his subject. He cherishes the hope that from his work there may emerge benefit to the whole of mankind. He is presenting opinions for your consideration and with which you are free to express your disagreement. His lectures have but one purpose, to provoke thought and disputation. There are no flags, no fanfares, no ritual, no rhetoric, no raving. It is not his purpose to enlist your affection or to arouse your hatred but only, with your help, to seek understanding.

Now turn your eyes to the east and look across Europe. One by one the flickering lights of learning had faded and the shadows deepened. From Europe the conception of knowledge and its advancement as an international responsibility had now completely vanished and the free flow of ideas across political boundaries had ceased. Elementary education had now but one aim; preparation for the Army. Thus the periodical "*Wehrerziehung*" (education for arms) in November, 1935, stated that "Teaching in school can give the young Bearer of Race (*Rassenträger*) something that will later be useful to him as Bearer of Arms. Tables can be learnt with horseshoe nails. Logarithms find their most beautiful use in the science of ballistics. In geography the world war can come into its own limitless rights. Chemistry has as much application in the military struggle with poison gas as in the fight for daily bread. Physical problems can be best explained by aid of a motor or a tank. Biological lessons can be taught by the wanderings of peoples in the past and the forcible constitutions of States. The teaching of foreign languages is particularly bound up with military-political explanations."

This is, indeed, the Nazi idea of "Education." It is not ours but we are able, nevertheless, to draw the sword and fling away the scabbard.

Clinical and Other Notes.

CLASSIFICATION OF THE ARMY INTAKE ON A BASIS OF PHYSICAL CAPACITY: REPORT OF A SUGGESTED METHOD.

BY MAJOR J. J. R. DUTHIE,

*Royal Army Medical Corps,
Specialist in Physical Medicine, Scottish Command.*

THE need for a method whereby men called up for service in the Army could be graded in accordance with their physical capacity has long been felt but, up to the present, no simple and reliable method has been evolved. The present system of medical categorization is based largely on the presence or absence of organic defects and conveys no clear idea of functional capacity. Accurate information, based on tests of function, regarding a man's physical performance would be of considerable practical value. Taken in conjunction with the selection grading it would enable men to be posted to the particular branch of the Service most suited to their physical and mental capabilities.

The essential features of any method are ease of application to large numbers and reasonable reliability. The following is a description of a method devised to meet both these requirements.

It was considered that the two most important qualities to be measured, from the point of view of military service, are strength and endurance. A third, but less important, quality is agility and although, for the sake of completeness, it would be desirable to measure this quality a reliable test has not yet been found.

Strength was measured by two tests :—

(1) Strength of arms, shoulders and dorsal region was measured by the number of heaves to a horizontal beam. The beam was arranged at a height, when the man was hanging at full arms stretch with hands shoulder breadth apart, his feet were just clear of the ground (fig. 1A). Starting from this position the man heaved to the beam until he could just touch it with the tip of his nose (fig. 1B). This was counted as one complete heave. The maximum number of heaves was recorded.

(2) Strength of legs and lumbar region was measured in the following manner. A pulley-weight system was constructed as illustrated in fig 2. The man stood with his feet a little apart, bent down and grasped the crossbar as shown. The knees were flexed and kept together between the arms. This was the starting position. A complete lift was accomplished by extending the knees and back, keeping the arms straight. This movement raised the weight from the floor. The end point was the first failure to accomplish a complete lift. The total number of lifts was recorded. The weight finally chosen for this test was 140 pounds. This weight could be comfortably lifted by every man but the total number of lifts accomplished even by the strongest was not excessive and the end point was definite.

From these two tests total strength was calculated in the following manner :—

(1) Strength of arms, shoulders and dorsal region = Number of heaves to the beam \times Body weight in pounds.

(2) Strength of legs and lumbar region = Number of lifts \times 140 pounds.

Total strength in pounds = 1 + 2.

To convert these values into foot poundals it would be necessary to measure the distance through which the body weight in 1, and the 140 pound weight in 2, were moved, but it was thought that the final figure for total strength would be reasonably reliable without the introduction of these additional measurements.

Endurance was measured by time taken to run three miles in Army boots, this being the shortest distance which it was felt constituted a real test of endurance. Boots were worn for two reasons :—

- (1) In view of rubber shortage gym shoes may not always be available at training centres.
- (2) The wearing of boots adds considerably to the severity of the test.

The results of the tests were correlated as follows :—

The stronger the man, the larger will be the figure representing his total strength in pounds. The better his performance on the run the smaller will be the figure representing his running time in seconds. Therefore if the total strength in pounds be divided by the running time in seconds the resulting figure will bear a direct relationship to the man's total physical capacity

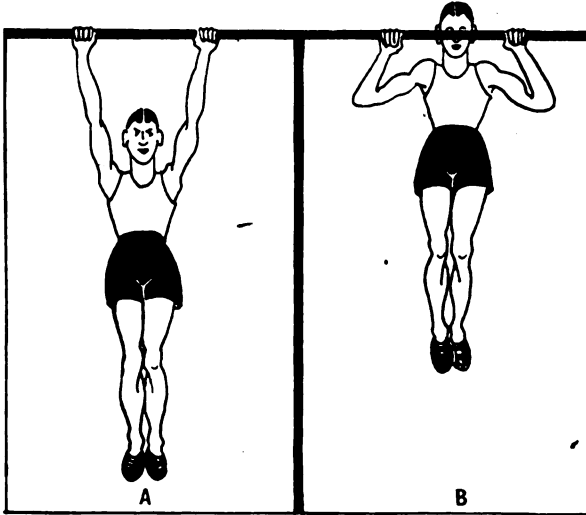


FIG. 1.

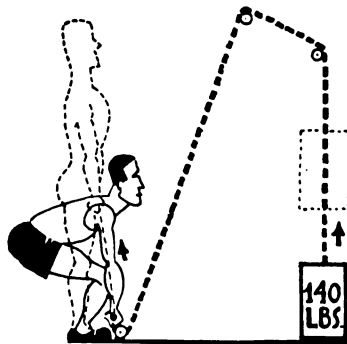


FIG. 2.

(a combination of strength and endurance). A poor performance in the tests of strength in combination with a poor running time will give a low figure. A good performance in both strength and endurance tests will give a high figure.

Written as a formula, if P. G. represents Physical Grade,
S represents Strength in pounds,
E represents the running time in seconds, then

$$P. G. = \frac{S}{E}$$

This simple calculation gives a figure of real practical value in assessing a man's physical capacity in terms of strength and endurance. It was found in practice that the great majority of results fell between 1 and 5. It is suggested that these tests may be used to place a man in a physical grade (P. G.), ranging from 1 to 5; 1 being the lowest and 5 the highest. Any man whose results fell between 1.5 and 2 would be 1+, between 2.5 and 3, 3+ and so on. A few men will give results over 5 but 5 grades would probably cover the great majority of the Army intake in their first week or two of training.

The method described was tested out at an Army Convalescent Depot. The following routine was adopted. The tests were performed by volunteers from men who had completed their rehabilitation and were awaiting posting. All candidates selected were Category A1 and professed themselves to be free from any residual effects of their original disability. The tests of strength were performed in the morning and the run in the afternoon. The men were

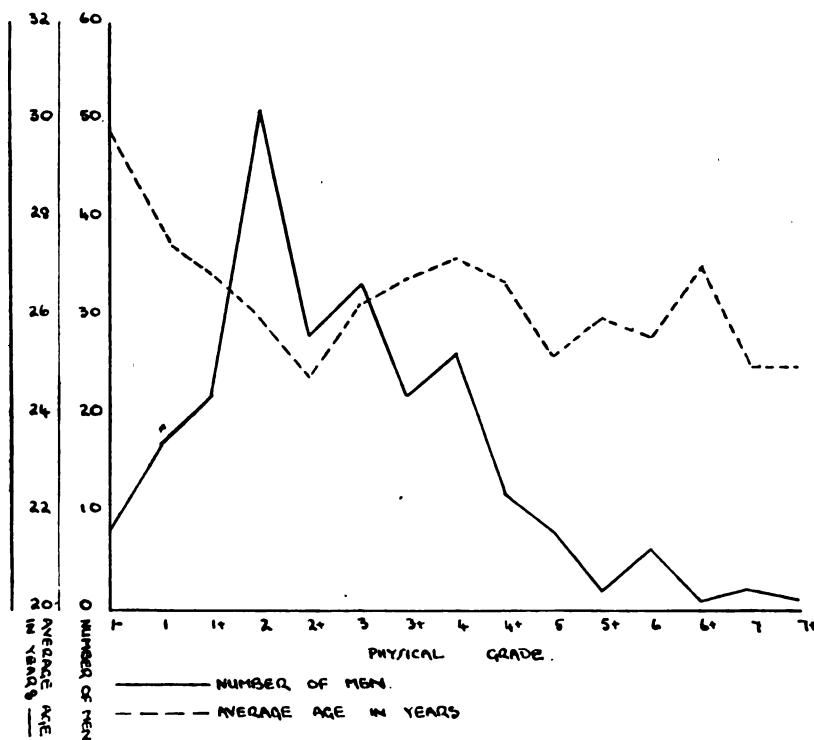


FIG. 3.

paraded in the gymnasium at 09.00 hours dressed in gym vests, shorts and Army boots. Their age, height, and weight were recorded. The heaves to the beam were performed first, then the lifts. The men were paraded again at 14.00 hours. A three miles' course had been measured along reasonably level road (ideally speaking the course should be level as possible to ensure uniformity of results at different training depots). The men started off in a body, having been instructed that each man must put up his best performance. A time-keeper and two recording clerks were posted at the finishing post. The number of men completing the tests was 238. The results obtained are recorded on a graph (fig. 3). This shows the total number falling in each grade and the average age. Eight men failed to attain Grade 1. These are shown as 1—. Although the numbers are relatively small, the fact that there is a wide variation in performance amongst men in category A1 is well illustrated.

SUMMARY.

A method of grading men according to their physical performance is described. The results obtained in the case of 238 men in Category A1 are presented. Five main grades and five intermediate grades are suggested, based on the results of three tests. The method is simple and could be readily applied to large numbers. If, after a more extensive trial, the results were found to be reliable, it is suggested that the physical grade would be of considerable value in determining the branch of the Service to which a man should be posted.

DISPOSAL OF SULLAGE WATER IN EGYPT.

BY LIEUTENANT-COLONEL A. M. CRITCHLEY,

Royal Army Medical Corps.

WHEREVER troops are encamped the disposal of sullage water becomes a problem which, if not successfully solved, gives rise to a nuisance. This problem is especially important in a country like Egypt where collections of water assist the breeding of insect pests and become definite menaces to the camps and their neighbourhood. The following article briefly describes some of the methods employed to deal with the sullage water both in the arid desert regions and in the highly watered Delta district.

The vast increase in the number of troops stationed in this country has led to the erection of many new camps which, owing to the military situation coupled with the needs for stringent economy in supplies of engineering materials, have not always been ideally sited or constructed so that the most efficient method from the sanitary viewpoint could not be employed invariably.

MAIN DRAINAGE.

In some of the barracks the solution of sullage water disposal has been to discharge into the municipal sewerage system and this has been adopted whenever practicable.

DISPOSAL INTO IRRIGATION CHANNEL.

A few camps, situated near cultivated land but not near dwellings, have been piped and the sullage water passed through a sedimentation tank in which chemical treatment with ferrous sulphate and lime has been carried out prior to discharge into an irrigation channel. Provided the first thirty or forty metres of ditch after the outflow are kept cleansed, this method has proved satisfactory.

SOAKAGE PITS.

Temporary camps have utilized this method of disposal but it is a method which has not been successful in semi-permanent or permanent camps. Contrary to common belief, sand will not absorb unlimited supplies of water so that the pits block up and flood. This failure of absorption may be due to several causes. Thus, faulty supervision of grease traps or high atmosphere temperature fails to remove grease which coats the sides of the pits, rendering them practically impervious. Again, sand contains a high proportion of clay or plaster of Paris according to the area and the action of the water reduces its powers of absorption quickly.

EVAPORATION PANS.

This method so often employed in hot climates has proved eminently suitable in many camps. A series of pans is fed in turn with sullage water which has previously passed through grease traps. The water evaporates rapidly and by the time the pans have been filled, the first one is ready to receive water again. The water is run in to a depth of 6 inches and, if not entirely free from grease, this is left as a hard deposit on the surface of the pan and is removed by scraping and incinerated.

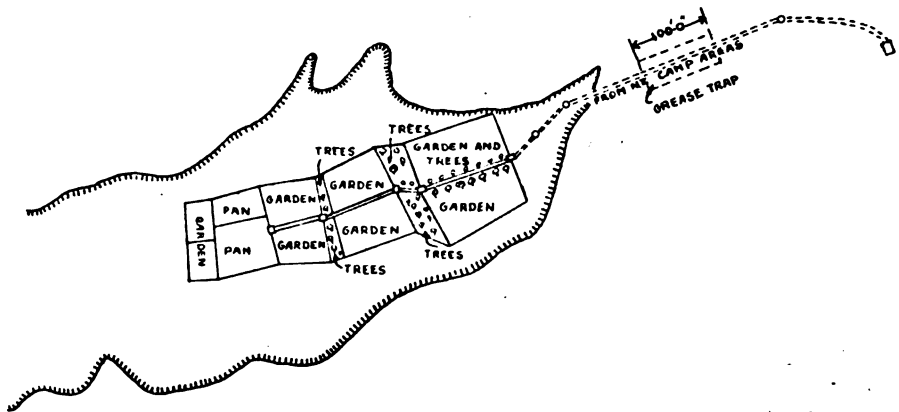


DIAGRAM 1

BORINGS TAKEN IN THE CENTRE OF CAIRO

Metres	Nature of Soil	Specification	Remarks
1.00		Ordinary filling: compressible	Strata of Argillaceous filling Compressible Bad supporting power.
		Ditto - Argillaceous	
2.50		Compact viscous argillaceous filling	
3.00		Earth filling, less viscous with small debris	
3.85		Brown argil semi-soft, permeable with debris of mica	
4.20			5.00
5.00		Hard brown argile, semi-permeable with particles of mica	Strata of hard argil Waterproof. Very plastic. Good supporting power.
6.00		Grey-brown argil, semi-soft, permeable, compressible, with debris of mica	
6.65		Ditto - softer, grey, with smaller quantity of very fine sand	
8.16		Fine grey-blue argil, soft, permeable with mica debris, compressible	Strata of soft argil. Compressible
9.00		Ditto - Grey, cleaner	
10.00		Blue-black argil, very soft, clean, very permeable.	Argillaceous Strata. Muddy Very bad supporting power.
11.40		Black argillaceous mud, sandy and very compressible	
12.00		Ditto - black & more sand	
13.90		Hard layer of petrified argil, waterproof	13.93
13.95		Siliceous sand, little argil	Sandy Strata. Little plasticity. Slightly compressible. Medium supporting power.
14.20		Ditto - purer and cleaner	
15.00		Ditto - finer & cleaner	
16.65		Ditto - fine & clean	
17.00		Ditto - very fine & clean.	
18.30			18.00

DIAGRAM 2

The above method was used at the beginning but it is now modified in that each pan is cultivated. Crops of varying character are grown, such as peas, beans, cabbages, tomatoes, maize, loofah, eucalyptus trees, etc. Far from interfering with evaporation it is found to assist it and the Desert blossoms forth into useful crops for the use of the neighbouring troops or hospitals. The greatest measure of success is when a very large grease trap, 100 feet long, is employed but, even if grease does come through the pans, it does not interfere with evaporation or become a nuisance provided it is dug in about every month. If the attendants are careless and fail to keep the irrigation channels free from vegetation there is some breeding of mosquitoes but the danger is non-existent when the pans are properly looked after.

The grease trap recommended in the Manual of Military Hygiene has had to be modified for use in Egypt. The modification is simply a prolongation of the second chamber which assists the separation out of the grease.

The sketch (diagram 1) represents the plan of an evaporation plant for treatment of sullage water.

SULLAGE TUBE SYSTEM.

In the Delta region the problem of sullage disposal is rendered difficult by the high level of the subsoil water which varies according to the rise and fall of the Nile. At the time of the Nile flood (August and September) the water level in this region is rarely more than a few inches below the surface and may, in fact, cause flooding through seepage. Soak-away pits and evaporating pans are absolutely useless under these conditions so that a much more elaborate disposal system has to be installed.

The sullage water must be passed through sedimentation tanks, followed by filter beds to extract as much grease as possible, before the water is run or pumped into Swallow tubes. These Swallow tubes, 6 or 8 inches in diameter, are sunk to a depth of at least 100 feet to reach the gravel stratum beneath the coarse sand (diagram 2).

During Low Nile these tubes will dissipate large quantities of water by gravity, but during High Nile the water level in the tank rises and the sullage water has to be forcibly pumped down the Swallow tube.

My thanks are due to Major R. W. Walker, R.E., for his helpful criticism and notes.

ICE HOUSE.

BY MAJOR P. P. FOX,

Royal Army Medical Corps,

AND

MAJOR A. E. GOODALL,

Royal Indian Army Service Corps.

THE idea of the experimental ice house described below arose from a discussion on the scale of issue of ice and the necessity of obtaining the maximum benefit from it.

The main points of discussion were :—

- (1) Shortage of ice and difficulties in supplying an adequate quantity—according to scale.
- (2) Difficulties in the supply of ice chests to units.
- (3) Wastage of food consequent on (1) and (2).

Arising from the above it was decided to construct an experimental ice house. The factors considered as governing the construction were :—

- (1) Availability of materials.
- (2) Simplicity of construction.
- (3) To be capable of construction by unit labour.

The original suggestion considered was a framework of bamboo fitted with shelves, the framework to be covered with Khas-Khas screens to be kept moist and so promote cooling by evaporation. This was rejected owing to :—

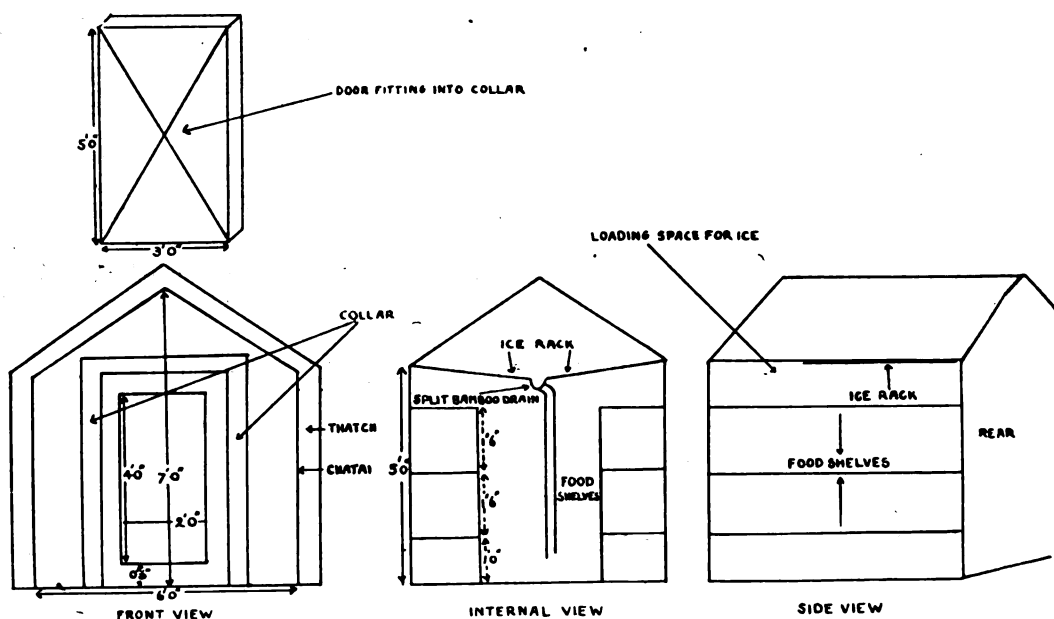
- (a) Shortage of supply and expense of Khas-Khas screens.
- (b) Necessity of maintaining Khas-Khas screens moist.

An alternative suggestion considered was the digging of an underground pit. This was rejected because of the high level of subsoil water. An extension of this idea, viz. the construction of a semi-underground brick-built chamber lined with cement, was rejected.

The experimental ice house constructed consisted of a bamboo framework, the walls and roof consisting of 6 inch thick thatching and chatai.

Measurements.—Internal measurements were 6 feet wide by 60 inches long—the height of the side walls was 5 feet, height at the centre 7 feet.

The doorway was 2 feet wide, height 4 feet 6 inches, and was continued to 6 inches from the ground level. The door consisted of a bamboo framework and 6 inch thick thatching, the measurements being 3 feet wide and 5 feet high, so providing a 6 inch overlap over the whole



perimeter of the doorway. The door was not hinged but fitted tightly into a collar 6 inches deep placed 6 inches from the edge of the doorway.

The fittings of the hut consisted of :—

(a) Three tiers of food shelves at 1 foot, 2 feet 6 inches and 4 feet from the ground level. Shelves were inclined slightly downwards towards the side walls in case of warping of the wood.

(b) Overhead ice rack sloping downwards towards a central bamboo gutter connected by a hollowed bamboo rod to a soakage pit. The ice rack did not run the entire length of the house—measuring from the rear wall, it measured 4 feet; this permitted blocks of ice being loaded on the ice rack.

It is considered that a tank in the hut should be substituted for the soakage pit :

- (a) To obtain maximum cooling effect of ice.
- (b) Value of water supply.
- (c) Less construction.

Trial Experiment.—The trial experiment with the house commenced April 12, 1943, and approximately 160 lb. of ice were put into the house at 09.00 hours daily. The inside temperature before the ice was put in was 80° F. By 18.00 hours this had dropped to 48° F. This temperature was maintained at 48° F. for the period April 12–24. The quantity of ice per day was reduced to 80 lb. on the 25th—the inside temperature rose to 52°–58° F. Indoor shade temperature as recorded by a maximum and minimum thermometer varied between 79°–94° F. and 73°–82° F.

So far as possible normal working conditions of the hut were observed, i.e. the house was opened and kept open at periodic intervals as if it were being used for practical purposes. Temperature readings were as follows :—

Daily load of ice	Date	Maxm. Temp.	Minm. Temp.	Inside Temp. of ice house
*160lb. of ice	April 12	87° F.	74	} 48° F.
" " " " " " "	April 13	80° F.	73	
" " " " " " "	April 14	79° F.	73	
" " " " " " "	April 15	84° F.	75	
" " " " " " "	April 16	86° F.	77	
" " " " " " "	April 17	96° F.	76	
" " " " " " "	April 18	86° F.	76	
" " " " " " "	April 19	88° F.	77	
" " " " " " "	April 20	88° F.	76	
" " " " " " "	April 21	83° F.	77	
" " " " " " "	April 22	84° F.	77	
" " " " " " "	April 23	85° F.	78	
" " " " " " "	April 24	84° F.	77	} 52°–58° F.
80lb. " " " " " " "	April 25	88° F.	79	
" " " " " " "	April 26	91° F.	82	
" " " " " " "	April 27	94° F.	82	

*Using 160 lb. of ice it was found that approximately 20–30 lb. was still present the following day.

It is considered that the above figures show the experimental ice house to have been successful and that the building of such an ice house for each cookhouse would effect a considerable saving of both ice and rations.

The optimum load of ice required would need to be determined by each unit depending on its location. It is thought that the load used should be sufficient to maintain the house temperature at not more than 50° F.

It is thought that the following amendments to the original plan would be of value :—

(1) Insulating of the side and rear walls by heaping earth against them; this would enable the thickness of the " thatch " to be reduced to 2 inches.

(2) Increasing the length of the ice house to 7 feet, the lower tiers of the shelves to be made movable. This would enable the ice house to be used for the emergency treatment of heat stroke and heat exhaustion cases.

(3) Erection of a tent top or outer chatai covering with an air space. It is considered that this would help to (a) reduce the temperature inside ice house ; (b) protect ice house during the monsoon.

SUMMARY.

(1) Improvised ice houses can be constructed of materials readily available in most parts of India.

(2) They can be constructed by unit labour.

(3) They enable a considerable saving of ice to be effected.

(4) They effected a considerable saving of food and permit of meat being " hung."

(5) They provide emergency treatment accommodation for heat stroke and heat exhaustion centres.

Thanks are expressed to Brigadier C. L. F. Stevens, M.C., for permission to carry out the experiment and for his helpful suggestions and criticisms.

OCCLUSIVE DRESSING—THE ALMAZA PATCH.

BY MAJOR A. G. HAMMOND,

Royal Army Medical Corps.

IN the late summer and early autumn of last year difficulty was experienced at B.D.R.A. in obtaining adequate supplies of Elastoplast and zinc oxide adhesive plaster.

It has been found that desert sores and similar conditions respond best to an occlusive method of treatment. In this Depot, medical services are performed under field conditions in a sandy area. Various occlusive dressings were tried in lieu of the above mentioned preparations, including complete plaster of Paris casing. Use of plaster of Paris in the usual manner rapidly expended stocks of both plaster and bandages. An adhesive plaster of Paris dressing was eventually achieved which has proved successful in the treatment of conditions for which it was intended.

The dressing consists of a powder rubbed into the mesh of an open weave bandage, as it would be for a prepared plaster of Paris bandage. The powder is composed of plaster of Paris 75 per cent, tragacanth powder 25 per cent, to which is added acriflavine powder to give strength 1 : 1,000. Other antiseptics such as gentian violet or sulphanilamide may be used.

The powder must be thoroughly mixed and finely ground. At the Base Depot this was done with the pestle and mortar.

Under conditions permitting aseptic preparation, an added antiseptic may not be necessary.

REQUISITES FOR THE DRESSING.

- (1) The above mentioned Almaza Patch powder.
- (2) Open weave bandage and cotton-wool.
- (3) Eusol solution.
- (4) Vulcanite pestle and mortar from Medical Companion, scissors, dissecting forceps, palette knife.

METHOD.

The ulcer or sore is well washed and swabbed with eusol. A piece of bandage is cut roughly to the shape of, and slightly larger than, the ulcer or sore to be treated and powder is thoroughly rubbed into its mesh in the mortar. A little powder is first sprinkled on the sore; the patch is then taken from the mortar with the dissecting forceps, immersed in eusol solution or water, applied to the lesion and moulded with the palette knife. The patch must be kept at rest until dry and set. This does not take long.

With practice the application takes very little time, but time taken over the moulding is well repaid as it is essential to have no wrinkles in the dressing and close apposition to the surrounding skin. It is not necessary to have a large amount of powder on the patch.

The dressing should be left in situ until healing has taken place, when it may drop off or, if loose, may be pulled off or soaked off with water.

The dressing is not waterproof and care should be taken in washing and bathing not to displace it, though a little water will do no harm.

In a certain proportion of conditions treated, reaction will occur varying from erythema of the surrounding skin to slight suppuration under the patch. This does not call for any interference as healing is not delayed.

Indolent ulcers, which are frequently met, respond well to an application of silver nitrate and sealing with the patch.

The dressing has been used with success in the early vesicle stage of Desert sores, early treatment of boils, in treatment of impetigo and, particularly, in abrasions and minor wounds of the head and face. The dressing has been applied over small lacerations and in all cases rapid healing has been obtained. The object of the patch is to produce an occlusive adhesive dressing which will splint the affected part thus giving necessary rest to the diseased tissue.

For lesions round the knuckles which are likely to receive knocks and strains, it is advisable to carry the dressing completely round the finger.

This method of treatment is extremely economical as very little powder and bandage are required, no vital war material is used, and much material expended in frequent changes of dressings is saved. It is comfortable and does not restrict movement. There is no irritation to the skin and no folliculitis.

If it were used to any large extent, it is suggested that the dressing should be made up as in the prepared plaster of Paris bandages, whereby considerable time would be saved in its application.

The powder can be made up in quantity and keeps satisfactorily in cigarette or Elastoplast tins. (An ordinary 50 cigarette tin will hold enough powder for 500-600 average sized dressings.)

I wish to thank Lieutenant-Colonel B. C. Tate, R.A.M.C. (Adviser in Dermatology, M.E.F.), Captain J. B. Kershaw, R.A.M.C., and the Staff of the Medical Inspection Room, B.D.R.A., for their advice and co-operation.

AN IMPROVED MECHANICAL SUCKER.

BY MAJOR B. B. HICKEY,

Royal Army Medical Corps,

No.—Mobile Neurosurgical Unit.

THE following is a description of a mechanical sucker which was devised as an additional suction unit more easily portable than the usual one carried by a mobile neurosurgical unit. Apart from the electric motor providing the power, it has been made from scrap parts of the type that can be found in most large workshops.

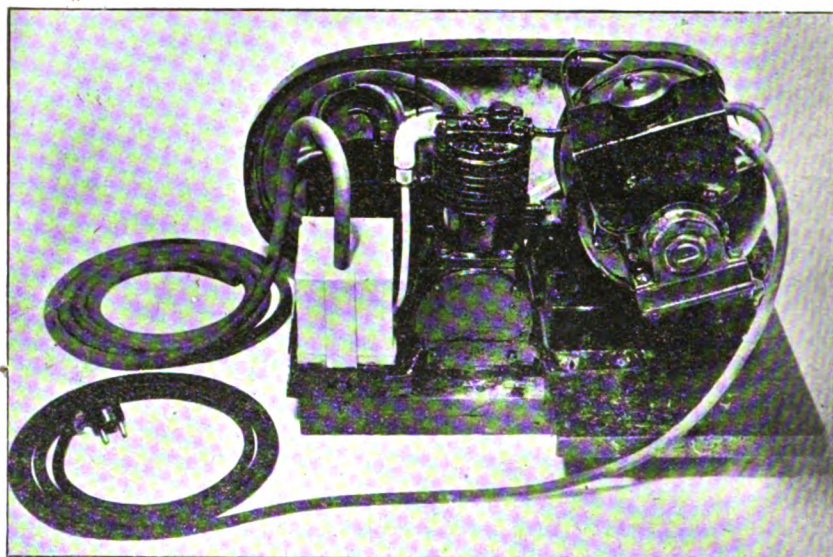
The pumping element is a standard Bedford power tyre pump. This is a detachable unit fixed to the gear box of the vehicle and engaged by a sliding spindle carrying a pinion. The pump itself is of about 75 c.c. stroke capacity, single cylinder, with valve incorporated in the cylinder head. Though devised as a force pump a good vacuum is produced if a tube is attached to the intake. When removed from the vehicle one is left with the complete pump with its own small crankcase and sliding shaft carrying the engaging pinion. The only modifications required were the plugging of various bolt holes in the mounting and the replacement of the sliding spindle by a longer fixed one carrying a pulley of 9 inches diameter. The inlet was connected to a chamber made of soldered sheet metal, of 400 c.c. capacity, the effect of which was to even out the vacuum. The inlet of this is connected to the suction bottles. Tubing used to connect the two and for the chamber inlet was ordinary petrol tubing.

The motor available on this occasion was a 230 volt $\frac{1}{4}$ h.p. alternating current type running at about 2,000 r.p.m. This is thought to be the minimum power which could be used satisfactorily for this purpose. A pulley 2 inches diameter was fixed to the motor shaft and the drive taken by an ordinary fan belt to the large one on the pump. This gave sufficient reduction. An additional switch was fixed to the motor but this is not an essential.

The motor, pump and chamber were mounted on a wooden base as illustrated. The details of the mounting would vary with materials available and will not be described. Working parts are covered in by sheet metal casing, two covers only being required, one enclosing the driving belt and the other the driving spindle and pinion. Lubrication is no problem as oil is carried in the crankcase of the pump. On working for the first time an unexpected source of noise was found in the exhaust but silence was easily achieved by the addition of a length of petrol tubing with a bell end lightly plugged with cotton-wool.

In use a good enough vacuum is given for all surgical requirements and, as the moving parts are simple and revolving fairly slowly, the unit should require little maintenance and

be sufficiently robust for very active service conditions. This one has not yet been used for very long periods at a stretch but there is no apparent reason why it should not work efficiently for several hours. The cylinder becomes warm but this is no disadvantage as the piston then works more smoothly. It was contemplated cooling the electric motor by leading the air outlet through it but the idea was rejected on account of the danger of running too much water vapour into the parts.



The accompanying illustrations explain more than any written description can convey. The disposition of the parts is well seen and also the arrangement of the covers. The small curved vertical tube on the pinion shaft casing is merely an oil breather.

The layout was designed by Lance Corporal W. T. Batho, R.A.S.C., who assembled the unit in a very simple workshop with few tools at his disposal other than a soldering iron.

SKI SURGERY.

BY MAJOR J. C. WATTS,
Royal Army Medical Corps.

I.—A BRIEF NOTE ON THE HISTORY OF MILITARY SKIING.

SKIERS are portrayed in the Stone Age carvings at Rødøy in Tjøtta [1] but the first authentic records of ski troops were those of King Sverre at the Battle of Isen [2] in A.D. 1200.

There are many references to ski troops being employed in Scandinavia and Northern Russia [3], and in 1733 Captain Emahausen of the Norwegian Army produced the first ski drill book [2], the uniform of the Norwegian soldier then consisting of a red hat, yellow jacket with red facings and yellow trousers, the officers sporting a gentlemanly topper; later, in 1788, the idea of camouflage appeared and, in 1808, Norwegian ski troopers achieved a notable victory over the Swedes.

It is important to realize that the ski of those days were dissimilar, the right ski being short, broad and with a fur sole to assist climbing, while the left was long and smooth for use in running. It was not until the latter half of the last century that the villagers of

Telemark in South Norway developed a new technique of skiing, enabling turns to be made without stopping, and in reality all modern skiing dates from this time.

The French Army was the first force outside Scandinavia to see the possibilities of ski troops and organized a military ski school under French and Norwegian instructors. Austro-Hungary also experimented with ski troops [4]. Germany, Italy and Switzerland followed suit but most of these experiments showed that the time taken to produce a proficient skier took too large a portion of the period of military training and ski troops were limited to small detachments for scouting and communications.

The Russians, however, in the war of 1904-05 against Japan, had medical detachments equipped with ski and improvised a ski stretcher [5].

During the last war, French and German ski troops met in a number of engagements, the principal one at Ste. Die on the last day of 1914; a Norwegian volunteer ski ambulance operated with these troops in Les Vosges in 1916 [6]; the Russians also employed ski troops in the Carpathians but were inferior to the Germans in mountain skiing and confined their activities largely to ancillary services, particularly medical.

After the last war the popularity of skiing increased enormously and all the continental powers developed ski troops to a greater or lesser degree. Ski troops were first employed during the present decade in the Russo-Finnish war on the Eastern frontier of Finland and surpassed their highest expectations, for a small force of ski infantry with a few sledge drawn light howitzers and mortars not only defeated but in some cases totally annihilated numerically superior Russian forces of all arms, the Finns using their mobility to encircle and isolate the Russians who were confined to the roads.

The Russians learnt their lessons well, not only copying but improving on the Finnish technique, and so were able to use the same tactics with great success against the Germans attacking Moscow.

It is clear that the use of ski troops has revolutionized winter warfare in areas under snow but, and this is very important, an extremely high standard of skiing is required, not merely the downhill running technique of the popular Swiss resort but arduous cross country (*langlauf*) technique, if ski troops are to be properly employed and the period of training necessary is three to four months for untrained troops and four to six weeks for proficient skiers.

II.—RECENT EXPERIENCES IN ITALY.

The last paragraph of the above summary would appear to preclude the development of British military skiing but when we come to the ancillary services, especially the Medical branch, a lower standard is required and the writer feels that the following account of recent experiences on ski in the Appenines may be of interest.

Most writers dealing with the employment of ski troops are considering an organized winter campaign under Arctic, Scandinavian or Alpine conditions, where a long snow season is expected and full provision is made. In Central Italy, snow is only found in the high Appenines, both coastal plains being free from snow, and forming the main combat zones in winter or summer as the extremely mountainous nature of the central part precludes extensive military operations.

In the Appenines snow conditions are variable but certain parts are snowbound for greater or lesser periods during the months of December, January, February and March and skiing centres were developed there before the war.

In view of the possibility of units being isolated by snow the Field Surgical Unit which the writer was then commanding was moved forward to the town of A—— with a light A.D.S. less Medical Officers under command.

There were three R.A.P.s at P——, C——, and M—— close to the fighting line and some eight to ten miles from A——; all these places were likely to be cut off by snow, sometimes for as long as three weeks. The fighting was limited to patrol activity and no great number of casualties was expected.

Since the number of ski available was small and the light A.D.S. likely to change personnel it was decided to train the personnel of the Field Surgical Unit to ski, both for collecting casualties from the R.A.P.s and to enable the unit to proceed on ski to the R.A.P. to operate there if this was considered more in the patient's interest; these circumstances were exceptional, of course, and normally evacuation would be the responsibility of the Field Ambulance.

With the co-operation of the A.D.M.S.s and the Civil Affairs Officer, seven pairs of ski and six Everest carriers were obtained, a ski stretcher was improvised very simply by boring two pairs of holes in a pair of ski so that the runners could be wired to the ski and the stretcher lashed to the binding; the transverse bars were lashed to prevent collapse and four tow ropes all of different length attached one to each runner. This was sufficient for hard snow or tracks but for soft snow an additional pair of ski was lashed inside the other pair by means of transversely placed ski sticks. I have no experience of the French model designed by Captain Pourchier [7], nor of the Norwegian Hunger-Modell Rettungsschiffen but, for the comparatively short distances involved, the above improvisation, though crude, was adequate.

Temperatures were seldom lower than 4° or 5° below freezing and the clothing problem was not serious although snow clothing would have been an advantage as serge picks up the snow and becomes saturated when a warm atmosphere is entered. However battle dress, a leather jerkin, woollen gloves and a field service cap with the flaps down, or a balaclava helmet, are found satisfactory; the Army boot being rigid and fairly waterproof needed only a slight hollowing of the heel with a gouge to make a suitable ski boot. In northern climates, of course, the clothing problem is not so easily solved.

Since R.T. communications were maintained between the various R.A.P.s and A—, information about the case or cases was available from the R.M.O. so the equipment taken was varied to the needs of the case or cases but a full scale was worked out consisting of five Army packs mounted on the Everest carriers, the anaesthetist carrying his own equipment in a haversack. No. 1 pack contained a Fish Kettle sterilizer containing a complete set of instruments already sterilized and wrapped in a sterile towel, two pairs of sterile gloves and another sterile towel placed on top to prevent rattling and the whole sealed with strapping. By carrying instruments already sterilized the timelag before starting the first case was materially reduced; the spirit lamps for the sterilizer were also carried in No. 1 pack to allow re-sterilizing and more sterile dressings and towels, wrapped in a sterile towel, completed the load. Pack No. 2, the resuscitation pack, contained three bottles of dried plasma and three of sterile water, two giving sets and six stomach warmers (it must be realized that hot water and other facilities were available at the R.A.P.s). Pack No. 3 contained supplies of Cellon plaster bandages, compressed dressings and gauze and a tin of vaseline gauze. Pack No. 4 contained four bowls, soap, nailbrushes, jaconet aprons and macintoshes and two tin containers of spirit. Each pack was wrapped in a blanket to protect it from falls. These loads were varied to suit circumstances as was the composition of the team.

Before discussing the training of the team it is emphasized that the only requirements were ability to proceed over snow on ski carrying a load or drawing a ski stretcher and it is not suggested that grace, speed, or endurance could be taught in the short time quoted. It was found possible with nine normally athletic young soldiers to train the four showing greatest promise in eight lessons of two hours each; at the end of this time all could perform with proficiency walking, traversing, kick turns, stemming, and stem turns while of course "l'arret Briançon" of the early French military school, consisting, as it does, of sitting down by the side of one's ski came naturally. In three weeks all members of the team had reached the required standard.

Finally, in addition to the practical value of this training, the problem of recreation in a small unit isolated by snow was solved and, instead of being confined to quarters, the entire unit enjoyed the opportunity of a healthy and invigorating winter sport with its consequent improvement in health and morale.

SUMMARY.

- (1) The development of military skiing is briefly retold.
- (2) The necessity for a high standard in combat troops and the impracticability of training large scale British formations is emphasized.
- (3) By contrast, the modest requirements of Medical Units in temperate zones are pointed out.
- (4) An account of an improvised skiing unit on the Italian front is given.

I should like to express my appreciation of V. A. Firsoff's excellent work on military skiing [8] to which I am indebted for much of the information on the historical and contemporary development of military skiing and which I would advise all those interested in the subject to read.

I should also like to thank Lieutenant-Colonel W. M. E. Anderson, R.A.M.C., for permission to forward this article.

REFERENCES.

- [1] HELGE REFSUM, D.C.L. "Some Aspects of Norway's Contribution to Ski History," *The British Ski Year Book*, 1927.
- [2] KJENNERUD, I. REICHBORN. "Traek av vor skilopnings historie," Aarbog, For. til Ski-Idraettens Fremme, Kristiania, 1907.
- [3] LUTHER, C. J. "Von der Geschichte des militärischen Skilaufes," *Der Winter*, München, Dec. 14, 1914.
- [4] Milirägarbergsdienst im Winter, 1907.
- [5] KJENNERUD, I. REICHBORN. "Nød Hjaelp For Skilpere," *ibid.*
- [6] TIDEMAND-JOHANNESSEN, OISTEIN. "Den Norske Skiambulance i Frankrike." Aarbog, For. til Ski-Idraettens Fremme Kristiania, 1916.
- [7] POURCHIER, CAPITAINE, Commandant l'Ecole de Haute Montagne. "L'Evacuation des Blessés en Terrain Enneigé," *La Revue du Ski*, Strasbourg, 1934.
- [8] FIRSOFF, V. A. "Ski Track on the Battle Field," Lindsay Drummond, Ltd., London, 1942.

CLEANSING OF PERSONAL FEEDING UTENSILS IN THE FIELD.

BY THE STAFF—ARMY SCHOOL OF HYGIENE.

A LONG- FELT want is the provision of means by which men may wash and properly cleanse their knives, forks, spoons, plates, mugs and mess tins.

To be satisfactory running hot water is essential but, without a piped water supply and elaborate apparatus, this cannot be "laid on" in the field.

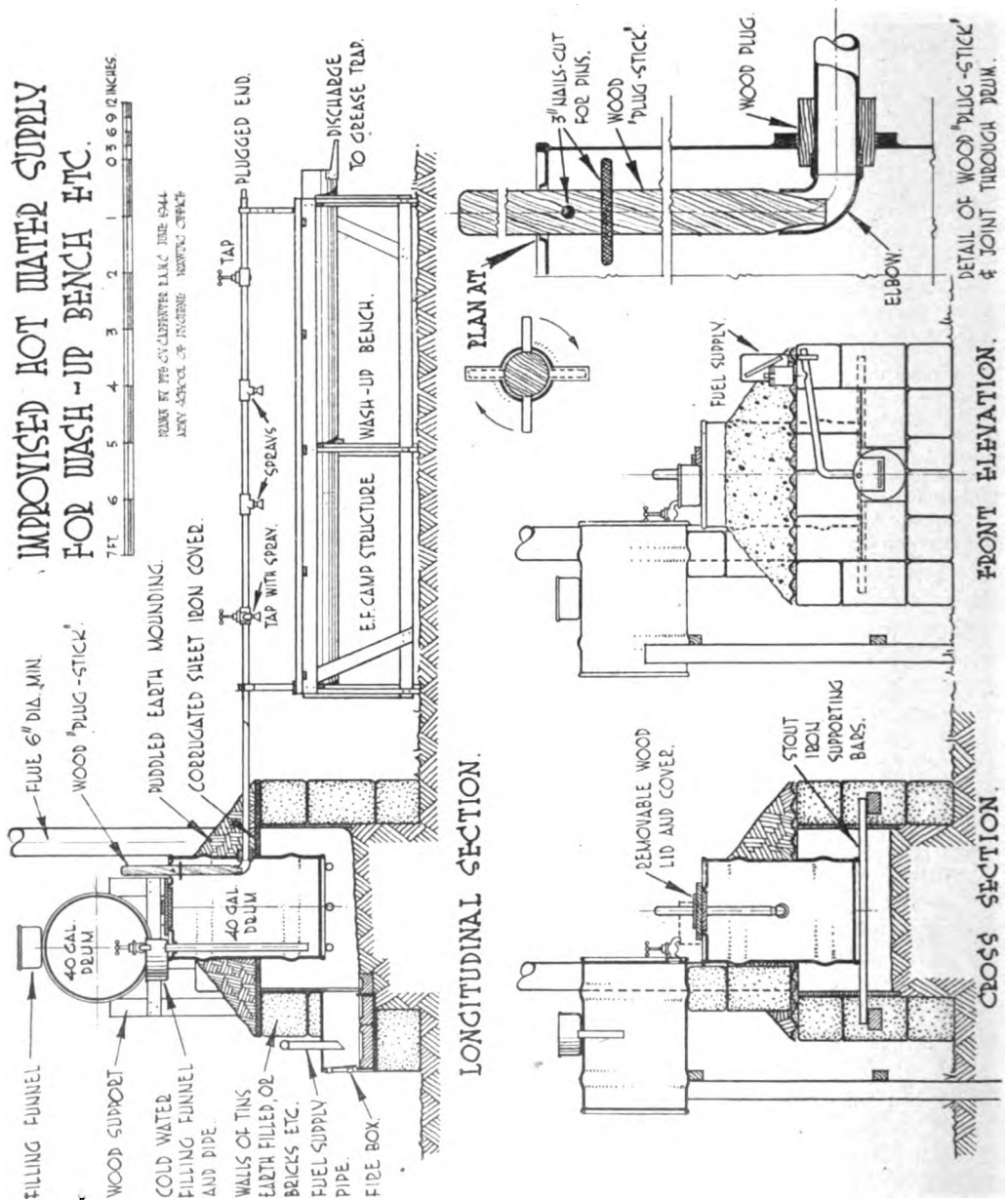
A simple method of providing hot water was described in an article forwarded for publication in the *Royal Army Medical Corps Journal*, but this had the disadvantage of all other improvised methods so far described in that the water is static and must be changed at more or less frequent intervals.

The apparatus described below (modified and tried out at the Army School of Hygiene) was used by Lieutenant-Colonel A. N. B. Odbert, *O.B.E.*, R.A.M.C., in the Field and proved entirely satisfactory. In operation it is economical of water and fuel and was greatly appreciated by the troops. The fire should be lighted while the meal is cooking and care should be taken to "tip up" with cold water as the hot water is expended. In one large camp approximately 80 gallons of water were used by 1,000 men. Small mops made by fastening cotton waste to a piece of wood 1 foot long should be provided at the wash bench. These mops greatly facilitate cleaning and prevent men scalding their hands.

The principal unit is an ordinary 40-gallon drum which is provided with a large (generally 2 inch diameter) plug at its centre and a smaller (generally $\frac{3}{4}$ inch or $\frac{1}{2}$ inch diameter) plug in one of its ends.

The drum is stood on end (the end without a plug) and supported on bars or bricks over a firebox provided with a flue in the ordinary way. In this position the 2 inch plug opening is situated half way up the vertical side. Into this opening a soft wooden plug is driven to

fit tightly : the plug is then bored through its centre and through it is driven a 1 inch or $\frac{3}{4}$ inch screwed draw-off pipe fitted with 3 or 4 "T" pieces to accommodate small taps, if these are available, or small sprays which can easily be made ; a small amount of soldering is necessary for these. The draw-off pipe passes through the wooden plug so that an "elbow" fitting



may be screwed to it to take a wooden "plug stick" which, passing through the top of the drum, can be used as a valve to be opened and closed at will and thus control the supply to the taps, etc. (See enlarged detail in the drawing.) A circular opening approximately 12 inch in diameter is cut in the top end of the drum to give access to the interior ; this is fitted with a wooden lid.

Cold water is supplied to the drum through a funnel head—a section of a 5-gallon drum—to which a piece of pipe ($\frac{1}{2}$ inch diameter) is fitted. This is passed through the small plug opening at the top of the drum and should reach to within 3 inches of the bottom.

When the 40-gallon drum is filled, the fire is lit beneath it and the whole of the water contained is heated to a temperature suitable for the washing of greasy utensils. Boiling temperature can be reached if desired, the drum being encircled by fire at its lower section and the greater part of the upper portion being insulated by turf, etc.

Fixed as shown in the illustration, one half of the water—approximately 20 gallons—can be drawn off under its own “head” and without any addition of cold water. This is sufficient to supply the two small sprays running continuously for approximately one hour. The remaining 20 gallons of hot water can be drawn off by displacement, i.e. by the simple expedient of adding cold water via the funnel inlet. This may be done by hand or, alternatively, a reserve drum may be fitted above the heater in the manner shown in the illustration. By these means, although one half of the hot water is actually below the point of draw-off, the whole is available for use and can be drawn off at the sprays or taps.

The apparatus may conveniently be fitted to an ordinary standard E.F. Wash-up Bench (See E.F. Camp Structures D.F.W. Drawing No. 10505). The $\frac{3}{4}$ inch screw-down tap normally supplied with this structure can be used to control the supply on the reserve drum. When the apparatus is in use, this tap may be kept open and delivering water at a rate roughly equal to that at which hot water is being drawn off. If at the same time the fire is kept burning a constant supply of hot water—limited only by the amount of the cold water supply—is obtainable.

This hot water apparatus is in every sense an improvization. It consists of materials normally available as salvage in the field and its construction is well within the scope of any unit possessing semi-skilled labour. Any sort of fire is suitable for its purpose; if waste oil is used, either in a surface burner or as an oil and water flash fire, the flue surrounding the drum should not be less than 3 inches in width. In the drawing a surface burning oil fire is shown.

Reviews.

HANDBOOK OF DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES. By A. E. W. McLachlan, M.B., Ch.B.Edin., D.P.H., F.R.S.Edin. Edinburgh: E. & S. Livingstone. 1944. Pp. vii + 364. Price 15s. net.

Venereal diseases have been much in the picture during the war years so that the appearance of McLachlan's Handbook of Diagnosis and Treatment of Venereal Diseases is most timely. It can be said at once, and without hesitation, that this little book, which is of handy size, should prove most useful to both practitioners and students. Dr. McLachlan is well known as a most competent and careful venereologist and, throughout his book, there is evidence of trained observation and painstaking investigation; the illustrations, many of them in colour, are beautifully produced and could hardly be bettered; in fact the book is worth buying for these alone; a coloured plate showing the *Trichomonas vaginalis* would have added to its value. The contents are set out on more or less standard lines and details of treatment conform to modern ideas; opinions expressed are founded on experience and the latest methods of treatment are not paraded as panaceas, those which have stood the test of time being preferred to half-tried novelties. The treatment of early syphilis recommended is the concurrent-intermittent, the one most generally employed in this country, but the alternating-continuous is also described; neoarsphenamine is apparently preferred to mapharside, a comparatively new drug more favoured in U.S.A. than in U.K.

It would seem almost churlish to criticize adversely such an excellent little book but it does appear that the author has rather spread himself at the outset and had to compress the

last part ; ten lines only are accorded to the section on non-gonococcal urethritis, a condition which is worrying many venereologists nowadays.

Provocative arsenical injections, recommended in several places, are seldom used by modern syphilologists, who regard them as of little value, whilst the expression "positive serology," as was recently pointed out in a contemporary journal, is unscientific. More, with advantage, might have been said about the interpretation of serum reactions in syphilis, a subject which daily becomes more complicated and one on which the learner needs sound guidance ; the same applies to intravenous T.A.B. therapy ; this latter is a most useful therapeutic measure in certain conditions, notably sulphonamide-resistant gonorrhœa and chancroid, but one which carries a certain risk to life and which should not be undertaken by the inexperienced or without all modern hospital facilities for combating shock and hyperpyrexia.

Unfortunately the literary standard leaves much to be desired ; discords abound and grammar is at a discount ; plural nouns with singular verbs are common, cannula and canula occur with almost equal frequency, mistakes in spelling are numerous, whilst the figure on page 220 of the doctor examining the "prostrate" (*sic*) but looking at the camera instead of at his patient is likely to irritate rather than instruct the reader.

These are but comparatively minor failings in a book which is full of sound teaching but which should be used rather for reference than read at one or two sittings.

REGIONAL ANALGESIA. By H. W. L. Molesworth, F.R.C.S.Eng. London : H. K. Lewis & Co., Ltd. 1944. Pp. viii + 90. 42 illustrations. Price 8s. 6d. net.

A surprising amount of information is included in this excellently-produced, easily-readable, slender volume by a surgeon who has a wide experience of regional analgesia. There is no padding here. The author's opinions are very pleasing and, though an enthusiast for the method, he is no fanatic. As he says, "Extreme views are nearly always wrong ; but it is just as wrong to condemn the possibilities of regional analgesia unheard as it is to assert that general anæsthesia is rendered obsolete by the advances which have been made in a sister art."

The opening chapter on general principles is very sound and indications and contra-indications for the method are clearly given. The way in which apparatus should be cared for is well described and there is an excellent discussion on the concentrations and dosages of drugs to be used, together with a useful warning against unnecessary excessive dosage which is all too frequently encountered. The author deals only with the drugs which he himself has used—chiefly procaine (to which he refers as "novocain") and nupercaine. It is surprising that he still refers to the latter as "percaine (nupercaine)," since the makers of this drug changed its trade name to "nupercaine," some time before the publication of this book, to avoid confusion with procaine (a serious confusion against which Molesworth gives a warning). Anethaine, now widely used when long-lasting regional analgesia is required, is not mentioned.

Simple descriptions are given of methods which the author himself has found useful and his background of personal experience is very evident. Details are given of the nerve blocks suitable for operations in various parts of the body. The author points out that it was not possible to include as many diagrams as he would have wished but the anatomical drawings are adequate, clear and easily understandable. The chapter on regional analgesia for abdominal surgery is especially useful and the description of paravertebral block is particularly good. Ear, nose and throat surgery and dental surgery are the only branches for which detailed descriptions of regional methods are not given. The book concludes with a chapter on spinal analgesia which is brief and helpful but which does not pretend to be comprehensive.

Indebtedness is acknowledged to Pauchet of Paris, chiefly, and in particular to "Anesthésie Régionale" by Pauchet, Sourdat and Labat. The English translation of this work by Labat has for long been a standard textbook on regional analgesia. References to works on regional analgesia would be a welcome addition to Molesworth's book.

Due regard is given to individual preferences of patients and surgeons but, in his final discussion on the advantages and disadvantages of regional analgesia for abdominal surgery, the author wisely says, "The objection that individual surgeons may be temperamentally unsuited to operate under regional analgesia is as true as is the fact that individual patients may be unsuited to undergo what is at best something of an ordeal. Whilst respecting the conclusions of both it is open to us to say that we believe both types of individual to be less common than is generally supposed." This opinion will be upheld by those with any practical experience of the method. Although the writer is obviously a surgeon who himself administers regional analgesia this book will be equally valuable to surgeons and to anæsthetists who wish to develop a sound and practical technique and may be confidently recommended to them.

F. B. B.

COMBINED TEXT BOOK OF OBSTETRICS AND GYNÆCOLOGY. For Students and Medical Practitioners. Fourth Edition. Revised by J. M. Munro Kerr, LL.D., M.D., F.R.F.P. & S.Glas., F.R.C.O.G. Edinburgh: E. & S. Livingstone. 1944. Pp. xii + 1,208. Price 42s. net.

The new edition of this well-known textbook preserves the same general arrangement as previous editions, stressing the interdependence of obstetrics and gynæcology.

Several chapters have been revised and expanded in the light of recent knowledge, including those on analgesia and anæsthetics in midwifery, the investigation and treatment of sterility and the treatment of gonococcal infections. A sound article on contraception is now included and mention is made of the rhesus factor in blood transfusions in obstetrics, though not yet in the treatment of hæmorrhagic disease of the newborn.

The section on the care of the infant in the neonatal period is detailed and practical. As before, stress is laid on the investigation and treatment of functional disorders and minor affections rather than on details of major operative technique. As a textbook for medical students and guide for general practitioners this book will maintain its deserved popularity.

M. E. C.

POLYGLOT GLOSSARY OF COMMUNICABLE DISEASES. Contribution to the International Nomenclature of Diseases. By Dr. Yves Biraud, M.S., M.D., M.P.H. London: Allen & Unwin. Pp. 353. Price 4s.

Owing to the confusion which often arises in translating the meaning of the names of diseases from one language to another, the author, as Secretary to the Mixed Committee on Nosological Nomenclature of the International Institute of Statistics and the Health Organization of the League of Nations, has had occasion to appreciate the need both for unifying the medical terms used in the different countries and for defining their meanings, which has resulted in the introduction of many terms in Latin and in languages other than French together with notes on similarities or divergencies of meaning of certain terms in different countries.

In the present Glossary the author has gone further and presents in tabular form, parallel to the detailed International List, a series of terms relating to communicable diseases used in the principal European languages found in various publications.

The Glossary should be of value to those whose work entails translating names of diseases from one language to another.

MANUAL FOR THE MICROSCOPIC DIAGNOSIS OF MALARIA IN MAN. By Amiee Wilcox, Washington (1943). U.S. Public Health Service. *National Institute of Health Bulletin*, No. 80. Pages 39 with 12 Plates of Illustrations six of which are in colour. Price 30 cents.

This booklet has been written by an experienced technician of the U.S. Public Health Service. It opens with an orthodox account of the life cycle of the malarial parasite but does not include any direct reference to the exoerythrocytic stage. This is followed by the usual textbook description of the morphology of the various plasmodia infecting man as seen in

thin film preparations. The technique of preparation, staining and examination of thick films occupies considerable space and is especially valuable. British readers will miss any reference to the staining methods of the Field type; the Giemsa or Giemsa-Wright methods are those recommended. The author gives sound advice regarding the recognition of the parasites in thick films and includes helpful tips in avoiding pitfalls.

The specimens for illustrations have been well chosen but their reproduction is not above the average. The publication will serve a useful purpose and will be welcomed by students but, good though this book may be, training in the recognition of malarial parasites can only be acquired in the laboratory under the guidance of an experienced teacher and by conscientious and long practice. These are acknowledged facts and are reiterated by the author. There is a golden rule which can be observed profitably by all those engaged in the identification of malarial parasites—"If in doubt you may be sure you are wrong."

Correspondence.

A SIMPLE METHOD OF PREPARING AN EFFICIENT GENERAL ANTISEPTIC.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—With reference to Captain E. S. Anderson's article on the preparation of Sodium Hypochlorite by Electrolysis of sodium chloride, the same thing in a slightly different guise appeared in your pages in 1916; this was an article by Dakin and Carlisle, on the manufacture of sodium hypochlorite from sea-water. This was carried out on the "Aquitania," then in use as a Hospital Ship, under Lieutenant-Colonel Fuhr, R.A.M.C., who furnished remarks on the process. I believe this is still carried out on some of the Cunard White Star ships, the solution being used as a universal disinfectant.

I met Commander Bunyan some time ago and asked him if the solution would be suitable for the Bunyan bag treatment of burns but he had not heard of it. I should think it would be the very thing for this purpose, for burns occurring at sea, and also for measures against mustard gas.

Yours faithfully,

G. B. F. CHURCHILL.
Major, R.A.M.C.

EMPLOYMENT FOR EX-OFFICERS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR COLONEL CUMMINS,—Major-General J. W. West, C.B., C.M.G., C.B.E., Colonel-Commandant, Royal Army Medical Corps, has received the following letter from Field Marshal Sir Philip W. Chetwode, Bt., G.C.B., O.M., G.C.S.I., K.C.M.G., D.S.O., President, the Officers' Association :—

The Officers' Association are anxious to bring the following to your notice in view of the fact that a certain number of officers are now leaving the Service on account of ill-health, wounds, etc., and more may be expected to leave in the near future and return to civil life.

(2) It was recently decided by the Army Council that the Employment Bureau for Retired Officers should be merged for the time being with the Appointments Branch of the Ministry of Labour and National Service, and in consequence of this the Officers' Association Employment Bureau has now been expanded with a view to helping all types of ex-Officer to find employment wherever they may be domiciled. This expansion of the Officers' Association

Employment Bureau has been welcomed by the Adjutant-General, who has thanked the Association for an action which he considers will contribute a very valuable supplement to the functions of the new section in the Ministry of Labour and will ensure that existing contacts will be maintained. The Secretary of the Association of British Chambers of Commerce has already notified the Officers' Association that the Chambers of Commerce Liaison Officers in many of the large provincial towns who had previously assisted the Employment Bureau for Retired Officers are willing to continue their assistance to the Officers' Association. This is most satisfactory and direct personal contact will be made by a representative of the Bureau with these Liaison Officers.

(3) The new title and the new address of the Bureau is as follows :—

The Officers' Association (British Legion) Employment Bureau, 66, Denison House, 296, Vauxhall Bridge Road, London, S.W.1. Telephone number—Victoria 0758, and all communications should be addressed to the Secretary at Denison House.

(4) The object of this letter is to supplement the communication which you have already received from Major-General Commings dated January 21, 1944, and to ask your help in making a success of the Bureau. It is hoped that Corps and Regiments will make known through Regimental Journals and otherwise to both Serving and Retired Officers that an organization still exists to which they can come and talk over matters, get sympathetic advice and be helped in every way to find congenial employment on leaving the Service.

(Signed) PHILIP CHETWODE, F.M.

107, *Rodney House,*
Dolphin Square,
London, S.W.1.

Yours, etc.,

J. G. FOSTER.
Lieutenant-Colonel.

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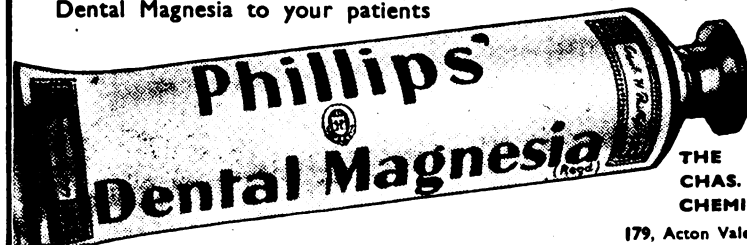
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Journal

OF

THE

Royal Army Medical Corps



ISSUED

MONTHLY

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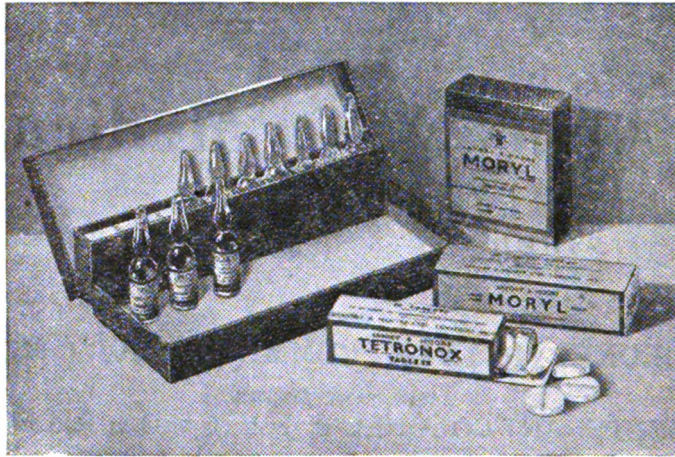
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Journal
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Original Communications.

MUMPS IN CYPRIOT TROOPS.

BY CAPTAIN R. N. HERSON,
Royal Army Medical Corps,

CAPTAIN G. P. CHRISTOPOULOS,
Royal Army Medical Corps,

AND

MAJOR N. F. COGHILL,
Royal Army Medical Corps, Medical Specialist.

IN November, 1942, an epidemic of mumps broke out amongst the troops in Cyprus. There appears to be little doubt that in the past this disease has been rare among the local population, and epidemics have not occurred, but information is rather inadequate as mumps is not notifiable to the civilian authorities. In ten years of civilian practice in Cyprus one of us (G. P. C.) has never seen a case. So far as can be discovered in discussion with other local general practitioners and the Government Public Health Department only a very occasional mild sporadic case has occurred. It is significant that large numbers of Cypriot civilians of all ages were observed with mumps in this epidemic and the general impression among civilian medical practitioners has been that the cases were much more severe than those observed previously. A number of such complications as meningitis have been seen. Civilian patients were not usually admitted to hospital or isolated in any way, many remaining ambulant for much of their illness. This lack of segregation may have influenced the spread of the infection to some extent. Until November, 1942, only a very occasional case of mumps had been seen among U.K. troops in Cyprus but, in contrast, a steady small flow of cases had come from Indian units. Amongst the U.K. and Indian troops mumps did not reach epidemic proportions. For reasons of security incidence figures cannot be given but, in spite of a well-marked preponderance of British and Indian troops, the great majority of cases came from Cypriot units among whom the incidence was high. The outbreak was notable on accounts of its severity and the number of complications, nearly all of which affected the Cypriots only. In consequence it appears to us worth while recording our experience of mumps in what amounts to virgin soil. Between November, 1942, and the end of April, 1943, 827 cases were notified to the Army medical authorities

in Cyprus and of these 432 were admitted to the hospital at which we were working. Of the cases notified 715 were Cypriot and 40 U.K. (the rest being Indian) and, of those seen by us, 408 were Cypriot and 24 U.K. Only one case (U.K.) was admitted to our hospital in May. There was no selection in the type of case admitted to us.

Age.—All the Cypriot patients were soldiers and therefore fell broadly into the age-group 18 to 45. The average age in this series was 20·5 years.

Salivary Gland Involvement.—This is shown in Table I. The incidence of glandular involvement in this epidemic was not greatly different from that in a series of 5,756 cases of mumps in Army personnel in Camp Wheeler, Georgia, U.S.A., reported by Radin (1918), or that in a series of 694 cases mainly amongst Australian troops observed by Macleod (1919).

From the records of the last 136 cases of our series further facts were obtained. In 109 of these five to eight days elapsed after admission before all the glands subsided; the average period was seven days, the extremes being two and fifteen. It was found that, in those cases in which the submaxillary glands were not involved on admission, if they later became so the average period between initial parotid enlargement and submaxillary spread was seven days. A striking feature in many of the cases appeared to us to be the extreme size of the salivary gland swellings, particularly of the parotids, the largest of all occurring in Cypriots. The onset of the disease was usually accompanied by a moderately severe bout of fever lasting in some up to a week.

Treatment and Length of Stay in Hospital.—The average length of stay of all cases was 16·5 days with extremes of thirty-six and twelve. This is little different from Radin's series where the average duration of illness was fourteen days. The patients were isolated for a minimum of eight days after the salivary glands had subsided or fourteen days from the onset, whichever was the longer period. Treatment was largely symptomatic and along the usual lines.

There were no deaths.

COMPLICATIONS.

Orchitis.—86 (21 per cent) of the Cypriots had this complication. Of these 34 (39 per cent) were right-sided, 41 (48 per cent) left-sided and 11 (13 per cent) bilateral. (For the U.K. troops the figures were as follows: total incidence 4 cases (18·2 per cent); one right-sided, two left-sided and one bilateral.) An average of nine days elapsed before the orchitis subsided. In most cases the orchitis was accompanied by a well-marked febrile reaction and moderately severe constitutional disturbance. Temperatures of 104° F. were common and the febrile period was fairly often prolonged to seven days. It was noticed that cases with orchitis were more liable to other complications such as meningitis or pancreatitis and that, when these were absent, headaches, mild epigastric pain and vomiting were frequent. The orchitis usually occurred six to seven days after the onset of the disease. If the affection became bilateral the second testis generally swelled up two or three days after the first. Stengel (1936) collected representative statistics for this complication from the literature and found that in seven series, each of over 1,000 cases reported by various authors, the average percentage incidence was 18·2 per cent, although the figures varied within very wide limits in different outbreaks. It is generally agreed that orchitis is very uncommon in childhood and is most likely to affect young adults. In the cases recorded in the literature there is usually little difference in the incidence of involvement of the right and left side. Stengel states that most authors find that unilateral orchitis is two or three times as frequent as bilateral, but here again there is considerable variation recorded. He also found from his review of the literature that orchitis as a rule follows parotitis and most often appears towards the end of the first week of the illness. Exceptionally orchitis precedes parotitis and may even occur without involvement of the salivary glands.

Meningitis.—There were 14 cases of meningitis, an incidence of 3·4 per cent. All these patients were Cypriots and most occurred early in the epidemic. Four of them had orchitis in addition. The usual symptoms were considerable malaise and headache and nausea often with vomiting. Some of the patients were drowsy and one was delirious. Neck

TABLE I.—SALIVARY GLAND INVOLVEMENT.

Submaxillary										One S.M. and one P.		One S.M. and two P.		Two S.M. and one P.		All four glands	
Parotid						Submaxillary											
R. alone		L. alone		Both alone		R. alone		L. alone		Both alone		No.		%		No.	
Numbers		No.		%		No.		%		No.		No.		%		No.	
U.K.		16*		7		43.7		1		6.3		5		31.3		0	
Cypriot		385*		69		17.9		36		9.4		256		66.5		0	
												1		0.3		0	
												4		1.0		13	
												1		6.3		0	
												1		6.3		1	
												0		—		6	
												0		—		1.6	

S.M. = Submaxillary Gland. P. = Parotid Gland. * No detailed information available as to glandular swellings in 23 Cypriot and 8 U.K. cases.

S.M. = Submaxillary Gland. P. = Parotid Gland.

* No detailed information available as to glandular swellings in 23 Cypriot and 8 U.K. cases.

TABLE II.—SUMMARY OF C.S.F. FINDINGS IN THE CASES OF MENINGITIS.

First lumbar puncture										Second lumbar puncture										Third lumbar puncture									
Case	Day of dis- ease	White cells				Protein mgm. %	Day of dis- ease	Pres- sure mm. C.S.F.	White cells				Protein mgm. %	Day of dis- ease	Pres- sure mm. C.S.F.	White cells				Protein mgm. %									
		Total per c.mm.	Polys. %	Lym- phos. %	Total per c.mm.				Polys. %	Lym- phos. %	Total per c.mm.	Polys. %				Lym- phos. %													
E. L.	9	160	130	—	Mostly	—	10	250	3	—	100	G. not +	12	80	26	—	—	—	G. not +	15	—	60	15	85	—				
N. G.	6	120	38	—	Mostly	—	7	120	880	8	92	—	16	150	0	—	—	—	—	14	110	0	—	—	—				
N. C.	12	250	33	—	—	G. not +	13	120	—	—	—	G. not +	—	—	—	—	—	—	—	—	—	—	—	—	—				
M. R.	11	185	20	—	—	G. not +	11	150	5	—	—	G. not +	—	—	—	—	—	—	—	—	—	—	—	—	—				
S. H.	8	135	60	—	—	G. *	8	75	60	20	80	G. not +	—	—	—	—	—	—	—	—	—	—	—	—	—				
K. M.	5	180	200	—	—	G. not +	10	145	50	—	—	G. †	—	—	—	—	—	—	—	16	165	22	—	—	—				
Y. M.	8	200	800	—	—	G. not +	—	—	—	—	—	Fourth lumbar puncture =	21	120	11	25	75	13.2	—	—	—	—	—	—	—				
A. O.	4	135	14	20	80	G. not +	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
S. C.	9	130	30	—	—	G. not +	13	115	20	15	85	26.4	20	110	11	5	95	20.0	—	—	—	—	—	—	—				
E. T.	7	110	180	—	—	G. not +	11	Very low	53	28	72	G. mod. +	18	120	13	8	92	26.4	—	—	—	—	—	—	—				
F. N.	9	140	16	5	95	25.0	14	110	11	4	96	25.0	—	—	—	—	—	—	—	—	—	—	—	—	—				
M. H.	6	not +	35	8	92	30.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
A. D.	3	not +	14	3	97	20.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
C. G.	7	125	14	5	95	30.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
										+ = Increase. G. = Globulin. * = Slight +. † = Very slight +. Mod. = Moderate.																			

+ = Increase. G. = Globulin. * = Slight +. † = Very slight +. Mod. = Moderate.

rigidity was constantly present at some stage although Kernig's sign was not often positive. High remittent temperatures sometimes lasting as long as a week and reaching as high as 105° F. were a striking feature in this series. The C.S.F. findings varied considerably from case to case as will be seen in Table II. The symptoms and signs started either concurrently with the onset of the mumps or up to ten days later (average six), and they lasted for one to seven days (average 4·5).

By way of control the C.S.F. was examined in twelve Cypriots during the acute phase of parotitis but showing no signs of meningeal irritation. There was no increase in the pressure in any case, and in eleven the cell count and protein content were normal. In one case there were fourteen cells per c.mm. of which 94 per cent were lymphocytes. These controls were performed towards the end of the epidemic when there were a few cases showing meningitis reaction.

The histories of three cases of mumps complicated by meningitis are reproduced as illustrations.

Case 1.—Private E. L., aged 19. Admitted on the third day of his illness with very tender bilateral parotid swellings and a history of fever with difficulty in swallowing. He remained afebrile and progress was uneventful until the eighth day when he developed a left epididymo-orchitis, considerable suffusion of the conjunctivæ and a temperature of 102·4° F. He was very restless and agitated during the night with fits of uncontrolled weeping and screaming. The next day the temperature, which was 105° F. in the morning, remained high and his headache, after steadily increasing, became very severe by the evening when there was marked neck rigidity and a positive Kernig's sign. He remained delirious and excitable. A lumbar puncture was performed and clear fluid under a pressure of 160 mm. C.S.F. containing 130 cells per c.mm. (mostly lymphocytes) was withdrawn. He passed a poor night in spite of receiving an injection of morphine and hyoscine. The following day he remained in much the same condition except that he now complained of an aching pain in the epigastrium. A lumbar puncture was again performed and on this occasion the pressure was 250 mm. C.S.F.; about 30 c.c. of clear fluid were slowly withdrawn. The white cells now numbered only 3 per c.mm., all of which were lymphocytes; globulin was not increased. By the evening he was a little quieter and showing signs of improvement. This was maintained for twenty-four hours after which there was a recrudescence of the signs of meningeal irritation. Because of this a third lumbar puncture was performed; the fluid was clear and not under increased pressure but the white cells numbered 26 per c.mm.; globulin was not raised. After this his condition greatly improved and in two days he was symptom-free. The abdominal pain which appeared on the tenth day lasted two days and was not accompanied by any physical signs in the abdomen. He was discharged from hospital thirty-two days after the onset.

Case 2.—Private A. D., aged 25. Admitted with a history that on the previous night he had developed a headache and pain in both sides of the face. Both parotids were swollen and his temperature was 103·2° F. with pulse-rate 120 per min. He had a severe headache, was drowsy and could not be properly roused. There was moderate neck rigidity and a mildly positive Kernig's sign. The following day there was an improvement, the patient being more conscious, although the neck rigidity and Kernig's sign remained unchanged. A lumbar puncture was performed. The fluid was not under increased pressure; there were 14 cells per c.mm. of which 97 per cent were lymphocytes and 3 per cent polymorphs; the protein was 20 mgm. per cent. A steady improvement was maintained and by the fifth day of the disease the temperature was normal and the headache had gone. Thereafter progress was uninterrupted and the patient was discharged from hospital fifteen days after the onset.

Case 3.—Driver N. G., aged 19. Admitted on the third day of disease with bilateral parotitis. The onset was accompanied by shivering and a frontal and occipital headache which had become severe. There had been mild vomiting. The day after admission to hospital there was moderate neck rigidity but no other abnormal physical signs. The symptoms persisted and on performing a lumbar puncture clear fluid under a pressure of 120 mm. C.S.F. was withdrawn. It contained 38 white cells per c.mm. (mostly lymphocytes). On the following day the neck rigidity was passing off but the headache remained the same

and a second lumbar puncture was carried out. There was no change in the pressure of the fluid, which was clear, but the white cells now numbered 880 per c.mm. of which 92 per cent were lymphocytes and 8 per cent polymorphs. After this clinical improvement was rapid and sustained but a third lumbar puncture eight days later (thirteenth day of disease), when there were no symptoms or signs, produced a fluid still containing 60 white cells per c.mm. of which 85 per cent were lymphocytes and 15 per cent polymorphs. He was discharged from hospital eighteen days after the onset.

In addition to the fourteen cases classed as meningitis about the same number of patients (including a U.K. Medical Officer and Sister) had a slight meningeal reaction lasting thirty-six hours or less. These cases were not confined to one part of the epidemic but were spread over the whole period. On account of the mildness of the symptoms and signs, or their short duration, lumbar puncture was not carried out and they were not classed as true cases of meningitis.

The C.S.F. findings varied from case to case, chiefly in the pressures and total cell counts. The former ranged from normal to 250 mm. C.S.F. but in the majority it was not greatly raised. Generally speaking, there was a tendency for the pressure to fall after the first lumbar puncture, and it was usually found that the operation considerably or almost completely relieved the headache, at least for a time. There was a wide variation in the C.S.F. cell totals at the first lumbar puncture, the lowest being 14 and the highest 800. In all cases the great majority of the cells were lymphocytes. The increase in cells lasted over fourteen days in one case (Y. M.), over twelve in two (S. C. and E. T.) and over ten in a fourth case (N. G.). A few days after the onset of the complication the cell counts usually bore little relation to the clinical state of the patient and might remain raised for some days after the complete subsidence of the meningeal signs; furthermore, even in the early stages some of the patients appeared to be more affected by the meningitis than would have been suggested by the C.S.F. findings alone, as in Case 2. The proteins in most instances did not differ from normal but in one the globulin was moderately increased on one occasion.

The frequency of meningitis or meningo-encephalitis varies greatly in different mumps epidemics. Larkin (1919) observed the complication twice in 2,400 cases. Gordon (1940) states that, in Dopter's large French Army series of 1910 and 1911, the frequency was 9.8 per cent. In the series of 5,756 cases of Radiu (1918) the complication was seen once. Steinberg is quoted by Gordon as finding meningitis in 10 per cent of 210 cases. References could be multiplied but the figures given serve to illustrate how widely the incidence of this complication has varied in the recorded series. It would appear that mumps meningitis has so far been rare in the M.E.F. (personal communication from Brigadier D. McAlpine, Consulting Neurologist, M.E.F.). One of us (N. F. C.) has seen one other case in a New Zealand private soldier in Egypt in 1940. At the same time the incidence of mumps in the M.E.F. outside Cyprus has been low. It might be supposed that the strain responsible for the epidemic here reported was more neurotropic than usual at least early in the outbreak. This hypothesis receives a little confirmation from the fact that the English matron of a civilian hospital on the island who had had mumps as a child contracted a second attack in this epidemic, complicated by severe meningitis immediately followed by an encephalitic phase with comatose state, there being a lymphocytic pleocytosis in the C.S.F.

As a general rule meningitis appears at a time when the salivary gland swellings are well marked or when they are beginning to subside but it may occur early in the disease and even be the first manifestation of mumps in which case diagnosis is difficult until a salivary gland becomes involved. The meningitis of mumps may be mild or severe and its duration is likewise variable. The usual symptoms are fever, headache and vomiting. Haden (1919) considered that encephalitis plays at least as important a part as meningitis in producing the clinical manifestations of central nervous system involvement in mumps. His reasons for this assertion are that cases may often be observed with severe headache and fever, and it may be with vomiting, but without other signs of meningitis; and further that even when there are signs the neurological symptoms may be out of all proportion to the findings

in the spinal fluid. In this epidemic our experience has been similar to Haden's. This author quotes Acher as noting convulsions, monoplegia, hemiplegia, aphasia, psychosis, stupor and disturbances of sensation among 31 cases of mumps meningitis. Such signs are undoubtedly indicative of an encephalitis as were those that developed in the English matron and in at least two Cypriots observed in the present series (Cases 1 and 2). Feiling (1915) in his critical review of mumps states that "clinical observations alone raise a strong presumption in favour of the possibility of the virus of mumps attacking the nervous structures of the brain itself." Although the prognosis in meningo-encephalitis of mumps is nearly always favourable yet on rare occasions there are permanent sequelæ such as hemiplegia or aphasia and in a few cases death has occurred.

It is generally agreed that a lymphocytosis in the C.S.F. can occur in mumps whether there is clinical evidence of meningitis or not but reports differ as to how often it is found without the clinical signs of this complication and recorded estimations of its frequency vary considerably. Feiling considered it a constant finding but Gordon quotes Popkova *et al.* as encountering it uncommonly and Chalié *et al.* as finding it in 5 per cent of cases. Teissier and Eismein also quoted by Gordon discovered it in 25 per cent of their cases. In our series only one of the 12 controls had a slight increase in the number of leucocytes in the C.S.F. It is thus clear that such an increase is not a constant finding. The C.S.F. in mumps meningitis may not return to normal for several weeks. Feiling quotes a case of Chauffard and Boidin in which a considerable lymphocytosis persisted until the forty-sixth day of the illness. The number of cells found varies from just above normal to many thousands. Usually the lymphocytes constitute over 90 per cent of the cells in the C.S.F., the remainder being polymorphonuclears, but sometimes the proportion of the latter is larger and may even show a predominance up to 70 per cent (Haden).

Pancreatitis.—Like meningitis this complication was confined to Cypriots. There were 9 cases giving an incidence of 2·2 per cent, most of which occurred towards the end of the outbreak. Six also had orchitis.

Pancreatitis was diagnosed only when the following signs were present: Fever, epigastric pain and tenderness; nausea and vomiting. There were a few patients with mild epigastric pain but no tenderness, only slight fever and perhaps mild nausea, but these have not been included as true cases of pancreatitis. The complication started between three and thirteen days after the onset of the mumps (average 7·7) and persisted for from one to seven days (average 3·4). As in the case of meningitis the febrile response was often striking. Diastase estimations starting within thirty-six hours of the onset of the complication were performed on twenty-four hourly specimens of urine in 7 of the patients; the results of these tests are given in Table III. It will be seen that the diastase content of the urine was not much

TABLE III.—URINARY DIASTATIC INDICES IN CASES WITH PANCREATITIS.

Patient	Test 1	Test 2	Test 3	Test 4	Test 5	Highest value
1	64	32	32	—	—	64
2	32	32	—	—	—	32
3	16	16	32	—	—	32
4	8	16	16	—	—	16
5 A. H.*	128	64	16	16	16	128
6 M. C.†	64	32	16	—	—	64
7	64	—	—	—	—	64
					Average	57

* See Case 5.

† See Case 6.

raised, only one case giving a significant high value. In three of the five cases where the tests were performed more than twice there was a decline of the diastase values to normal as the patients progressed to recovery. Controls were performed on 18 cases with uncomplicated parotid swellings; the results of these are given in Table IV. Both in the cases of pancreatitis and in the controls when more than one test was performed the interval between successive tests was twenty-four or forty-eight hours. Taking the average of the

TABLE IV.—URINARY DIASTATIC INDICES IN THE CONTROL CASES OF UNCOMPLICATED MUMPS.

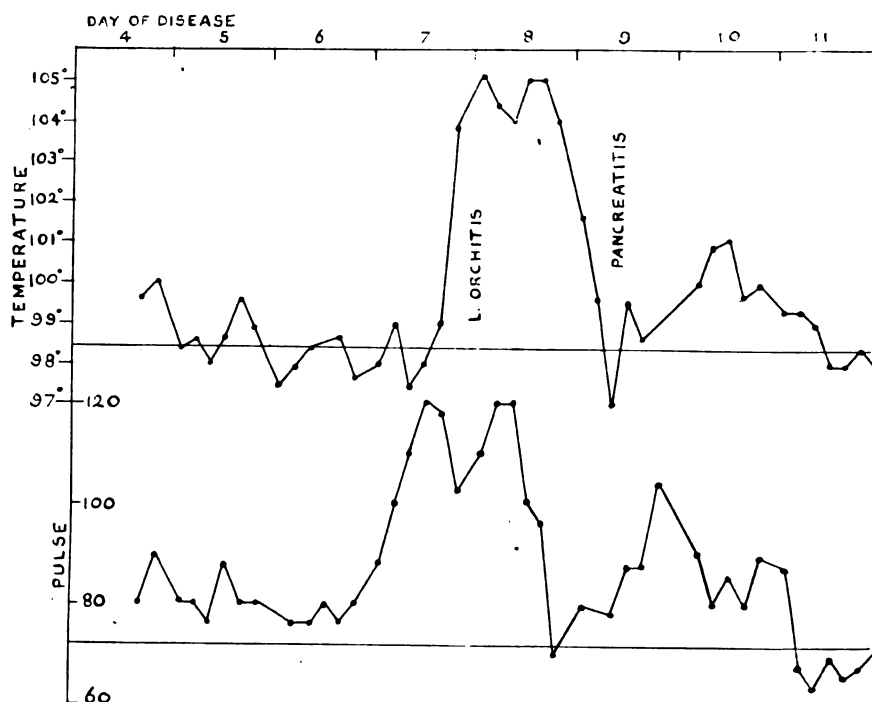
Patient	Test 1	Test 2	Test 3	Test 4	Test 5	Highest value
1	8	16	—	—	—	16
2	64	32	32	—	—	64
3	32	32	128	16	32	128
4	16	32	—	—	—	32
5	32	16	8	—	—	32
6	32	32	32	—	—	32
7	16	8	8	—	—	16
8	8	8	16	—	—	16
9	8	16	16	—	—	16
10	32	16	16	—	—	32
11	64	32	32	—	—	64
12	16	32	16	—	—	32
13	32	16	16	—	—	32
14	8	16	16	—	—	16
15	32	16	32	—	—	32
16	16	16	16	—	—	16
17	8	—	—	—	—	8
18	16	8	16	—	—	16
Average						33

highest values found in the cases with pancreatitis there is a small difference compared with the average of the highest values of 52 urinary diastase estimations in the 18 controls. One control on one occasion gave a result (128 units) as high as the highest in the pancreatitis cases. Thus this complication may occur without much disturbance of urinary diastase excretion but this is not surprising when the relatively mild and transient nature of the condition is considered. The urines of the 9 cases of pancreatitis were examined for sugar and albumin with negative results. In several cases the stools were inspected and showed no macroscopic evidence of steatorrhœa.

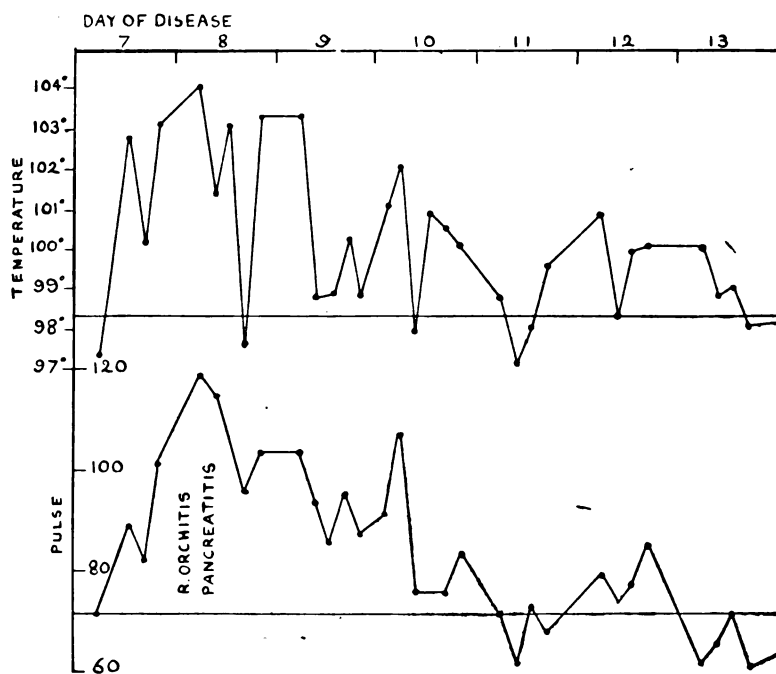
The following two case histories are fairly typical of this series :—

Case 5.—Private A. H., aged 30. Admitted with a three-day history of shivering and headache and with bilateral parotid swellings for the previous two days. There was mild fever which rose to 105.2° F. on the eighth day of the disease when left orchitis developed. The next day he complained of anorexia, nausea and a constant aching upper abdominal pain. He vomited once; there was constipation. The patient looked ill, his face appearing drawn and his complexion muddy; his tongue was furred. The abdomen was mildly distended and there was considerable tenderness in the epigastrium with slight resistance. During that night there was constant nausea and he vomited several times. The following morning he felt and looked better and the abdominal tenderness was improving although the other symptoms and signs were not greatly different and there was a continued mild fever. Urine collected during the previous twenty-four hours was found to have a diastatic index of 128 units. The next day he was much improved, vomiting had ceased and there was only mild anorexia, nausea, abdominal pain and tenderness. A second twenty-four-hour specimen of urine had a diastatic index of 64 units. Thereafter he made uneventful progress although his appetite was not normal until the eighteenth day of the disease. Three further twenty-four-hour urine specimens each gave diastatic indices of 16 units. He was discharged from hospital twenty-one days after the onset.

Case 6.—Private M. C., aged 20. The illness started with swelling of the left parotid gland which had subsided seven days later. The temperature rose on the seventh day and on the eighth reached 104.2° F. (see temperature chart) with the development of right-sided orchitis and malaise, anorexia, nausea, vomiting and intermittent shooting upper abdominal pain. The face was flushed; there was moderate tenderness in the epigastrium but no resistance. The next day the fever, vomiting and considerable abdominal pain continued. The epigastric tenderness had become more pronounced but there was still no abdominal resistance. Urine collected during the previous twenty-four hours had a diastatic index of 64 units. The following day he started to improve. Vomiting ceased, he felt better in himself and there was less epigastric tenderness. A second twenty-four-hour specimen of urine had a diastatic index of 32 units. Thereafter there was a steady improvement. By the fourteenth day the temperature was normal and a final urinary diastase estimation gave



Temperature and pulse chart of Case 5, Pte. A. H.



Temperature and pulse chart of Case 6, Pte. M. C.

a value of 16 units. Three days later the patient was symptom-free. He was discharged from hospital twenty-six days after the onset.

Available laboratory tests did not afford any help in establishing a diagnosis of pancreatitis which had to be made solely on clinical grounds. The findings were sufficient, however, to leave little doubt as to the nature of the condition. It is not known why all the cases of pancreatitis should have occurred in the later stages of the epidemic when there were almost no cases showing evidence of meningeal reaction.

There was more often orchitis with pancreatitis than with meningitis, this occurring in two-thirds of the former but only one-quarter of the latter cases. In the majority the onset of the orchitis was concurrent with the pancreatitis or within a day of it in contrast to the cases with meningitis where there was more often a lapse of three to four days between the onsets of these two complications. Meningitis and pancreatitis were not seen in the same patient.

As with other complications of mumps the incidence of pancreatitis has varied considerably in the published series. Among Radin's 5,756 cases this complication was encountered 14 times (0.31 per cent). Simonin is quoted by Bernard and Scheffer as having found pancreatitis in 10 of his 654 cases of mumps admitted over a four-year period to a military hospital. Nelson's "*Loose Leaf Medicine*" quotes Vaccarazia as having found an incidence of 1.21 per cent in 6,923 cases of mumps reported by eleven observers. Most critical reviews on this subject consider pancreatitis to be rare.

Farhan (1922) collected 119 cases of mumps pancreatitis from the literature and from his analysis of these he reached the following conclusions :—

(1) Urine and stool examinations have rarely been performed. Sugar was found in the urine only twice in the 23 cases in which it was looked for. An increase in faecal fat has on occasions been noted, but the number of observations is so small that no generalizations can be made from them.

(2) The febrile reaction accompanying pancreatitis is usually slight ; on only four occasions were temperatures as high as 103–104° F. recorded.

(3) Symptoms only persist for a short time, usually not more than forty-eight hours. Even in severe cases the duration is rarely more than seven days. Recovery is the rule.

(4) In 7 of the 119 cases there was orchitis and in 2 there was meningitis.

(5) In 28 cases the interval between the onset of parotitis and that of pancreatitis was four to seven days ; in 4 it was two weeks, in 10 less than four days and in 5 pancreatitis preceded parotitis.

(6) An abdominal mass representing the swollen pancreas was felt only 13 times.

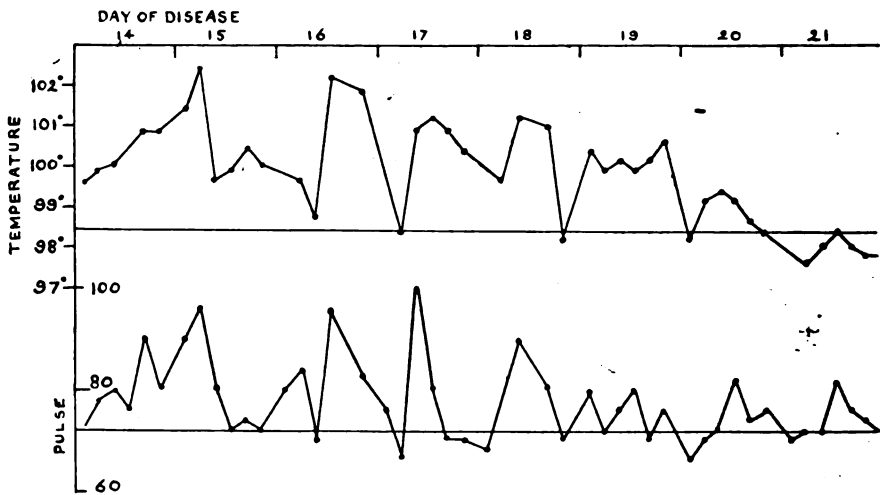
The literature subsequent to the paper by Farhan that we have had at our disposal has little to add to the above summary. It would appear that the febrile reactions observed in our cases were often unusually severe, in some perhaps because of the usually concurrent orchitis which was associated with the complication much more often than generally occurs.

Very occasionally jaundice has been reported as an accompaniment of pancreatitis. Radin encountered it in 4 of his 14 cases. It is recognized that diabetes may follow the pancreatitis of mumps but it is very rare.

No mention of the results of estimations of urinary diastase in cases of mumps with pancreatitis could be traced in the original articles at our disposal and it would therefore appear that this test has rarely been performed in these cases. The only reference to diastase estimations which we were able to find was a short paper by Dunlop (1933) who performed repeated tests on 60 cases of uncomplicated mumps. He found that a rise of urinary diastase may occur from the second day of the disease and persist after the glandular swellings have subsided. All his readings were above 30 units, some being over 200. He expressed the opinion that the diastase was probably derived from the parotids.

Simple Febrile Reaction.—In four patients, all Cypriots, there was a well-marked, moderately prolonged febrile reaction, for which no cause was found. The onset was after

the glandular enlargements had begun to subside. The only symptoms were malaise, lack of appetite, slight nausea and mild headache. Laboratory investigations were all negative, but it is perhaps unfortunate that an examination of the C.S.F. was not made in any of the cases. There were, however, no clinical grounds for supposing the meninges to have been involved. Chronic malaria is fairly common amongst Cypriots (although becoming increasingly less so) and it might be said that these unexplained fevers were in fact relapses precipitated by the secondary disease. Repeated blood films were examined (as in all the febrile cases) but no parasites were found; the fevers were in no way like that of a chronic malaria relapse and there was no splenic enlargement in any patient (ages between 18 and 25). It was considered most unlikely that malaria was a cause of the pyrexia in these cases. It is possible that these febrile reactions were the sole manifestation of abortive or otherwise silent complications.



Temperature and pulse chart, Pte. G. P.

Radin in his paper mentions (without comment or emphasis) that the temperature may rise to 106° F. without an obvious cause. He does not state at what period in the disease in his cases such an unexplained fever occurred. We have been unable to find more than one other author who makes any reference to this complication. From the point of view of the present epidemic the outbreak of mumps reported by Macleod (1919) is of especial interest. There were 694 cases, nearly all of which were Australian troops which, he states, "offered peculiar facilities for the spread of the disease in a virgin soil as very few of them had previously been exposed to this infection." He records that "in 48 cases which, after a primary attack of ordinary severity, had already entered on convalescence, the temperature rose abruptly on the seventh to tenth day to 100° or even 104° F., with a pulse-rate of 80 to 120. Apart from a feeling of general malaise, there was no local manifestation to indicate the seat of this complication, which is apparently toxic in nature; the temperature fell by crisis in two to five days and thereafter convalescence was uninterrupted."

Upper Respiratory Tract Infection.—This was noted in 23 cases. It usually took the form of follicular tonsillitis or a painful simple intense reddening of the fauces, tonsils or pharynx. Some of the patients had nasal catarrh and epistaxis. There was one case of otitis media. In the larger books of reference attention is drawn to these manifestations as being occasionally encountered in mumps.

Other Complications.—Four patients complained of pain in the ear made worse on moving the jaw. In all these the drums were normal and the pain was considered to be due to pressure

caused by a tensely swollen parotid gland. One case developed lobar pneumonia; acute bronchitis, usually mild, was not uncommon. Considerable conjunctival suffusion was seen on at least four occasions but its exact frequency was not determined; this is a well-recognized complication of mumps.

Changes in the Blood.—White-cell counts were performed on the blood of 7 of our cases and the results are shown in Table V. In none of these cases was there a leucocytosis;

TABLE V.—BLOOD WHITE CELL COUNTS IN MUMPS.

Patient	Total W.B.C.s per c.mm.	Lymphocytes %	Polymorphs %	Eosinophils %	Monocytes %
1	7,200	44	54	2	0
2	7,500	33	62	1	4
3	7,600	41	59	0	0
4	6,600	24	68	2	6
5	8,500	31	66	0	3
6	8,500	40	58	1	1
7	8,400	29	68	0	3

3 of them showed a mild relative and absolute lymphocytosis; 2 counts were normal; 2 were borderline. Feiling, in his critical review, came to the conclusion that there was a slight leucocytosis in mumps and also a relative and absolute lymphocytosis. Whitby and Britton (1942) state that "lymphocytes are always relatively increased" in the blood in mumps, but from a study of Feiling's tabulated results and our own very small series it appears that this may not always be so.

Comparison of this with other Epidemics.—As has been shown statistics for each of the recognized complications vary very considerably so that any comparison is difficult. In addition only a limited number of the relevant references have been available to us. All that can be done therefore is to present in tabular form an analysis of those series which contain complete data as to all the complications which occurred in each (see Table VI). It would

TABLE VI.—VARIOUS EPIDEMICS COMPARED.

Author	Number of cases in the series	Percentage with orchitis	Percentage with meningitis	Percentage with pancreatitis	Percentage with unexplained fever
Brooks, H. (1918) ..	1,059	24	0	0.28	0
Macleod, G. (1919) ..	694	20	0	0.86	6.9
Radin, M. J. (1918) ..	5,756	13.9	One case had convulsions. Mentions that marked nervous disturbance may occur but gives no details or figures	0.31	Mentions as occurring but no figures given
Bernard, M. B., and Scheffer, I. H. (1931) ..	252	10.7	0.79	5.2	0
Present series	408 (Cypriots)	21.1	3.4	2.2	0.98

appear from a study of the series given in the table that meningitis and pancreatitis are seldom associated in the same outbreak and that, in the epidemic here reported, the number of patients with complications was fairly high. Statistics for complications give an imperfect picture of the severity of an outbreak and a true comparison of mumps in different series is most difficult as it is usual to find that insufficient facts are recorded for this purpose. From a study of some of the literature, and our past limited experience, we have formed the impression that even in the uncomplicated cases our patients were on the whole more ill than is usually the case.

SUMMARY AND CONCLUSIONS.

Details are given of 432 cases of mumps occurring between November, 1942, and the end of April, 1943, principally in Cypriot troops stationed in Cyprus. These patients

represented part of an epidemic in the island at that time. The case incidence was high amongst Cypriots (troops and civilians of all ages) and very much higher among them than among U.K. troops present in the island. Nearly all the complications were confined to the former. From a comparison with other outbreaks the infection in this epidemic would appear to have been virulent. The evidence for this was the high case incidence, the number and severity of the different complications, the size of the glandular swellings and the fever and general disturbance, both in the initial phases and with the complications. Some of the U.K. patients were much more ill than is usually seen with mumps in adults. These features were less prominent towards the close of the epidemic as was to be expected. It seems likely that the virus gained virulence by rapid passage through a susceptible population.

We wish to thank Captain K. B. Gibson, R.A.M.C., for notes on some of the cases; Major J. Clark, R.A.M.C.; Brigadier D. McAlpine; the Director of Medical Services (Civil), Cyprus; Drs. J. H. Laurie and R. B. Wilkinson for permission to refer to their case of meningo-encephalitis; Lieutenant-Colonel M. J. Malley, R.A.M.C., O.C. to a General Hospital, M.E.F., for permission to forward this paper; and Sjt. A. Corner, R.A.M.C., for much valuable help.

REFERENCES.

- BERNARD, M. B., and SCHEFFER, I. H. (1931). *Am. J. Med. Sci.*, **181**, 255.
 BROOKS, H. (1918). *Med. Clin. North America*, **2**, 492.
 DUNLOP, G. A. (1933). *Lancet*, **2**, 183.
 FEILING, A. (1915). *Quart. Jour. Med.*, **8**, 255.
 FARHAN, L. W. (1922). *Am. J. Med. Sci.*, **163**, 859.
 GORDON, J. E. (1940). *Ibid.*, **200**, 412.
 HADEN, R. L. (1919). *Arch. Int. Med.*, **23**, 737.
 LARKIN, W. R. (1919). *Military Surg.*, **44**, 92.
 MACLEOD, G. (1919). *Brit. Med. Jour.*, **2**, 742.
 NELSON'S "Loose Leaf Living Medicine," **1**, No. 1923, 561A.
 RADIN, M. J. (1918). *Arch. Int. Med.*, **22**, 354.
 STENGEL, A., Junior (1936). *Am. J. Med. Sci.*, **191**, 340.
 WHITBY, L. E. H., and BRITTON, C. J. C. (1942). "Disorders of the Blood," London.

THE SURGICAL COMPLICATIONS OF TYPHUS FEVER.

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HAVING witnessed the development of gangrene of the lower extremities during and following typhus fever in Arab natives of North Africa the writer was stimulated to make a study of the surgical complications of this disease. The first patient seen was a male Arab dwelling in the mountainous regions who developed gangrene of the feet as the result of typhus fever. Being far removed from surgical aid a non-medical Arab had successfully amputated the distal half of the left foot, in effect a Chopart amputation was performed, and he had also removed several toes of the right foot. This patient recovered from the disease and the wounds were healing. The second patient was in the convalescent stage of typhus fever and developed dry gangrene of both feet necessitating amputation. The third patient had suffered from typhus fever several months previously and ascending gangrene of the left foot and leg supervened. On examination of this Arab it was found that the foot had gone and the leg was represented by bare tibia and fibula; all the soft tissues had sloughed away as far as a point one inch below the knee joint which was held in partial flexion. The condition of these three native Arabs following typhus fever raised the question regarding the possibilities of other complications of interest to the surgeon and the nature of the gangrene which may occur during and following the disease. As the result of many conversations with surgeons and physicians practising in North Africa and a study of the relevant literature on the subject the following account has materialized. The surgical complications may be considered under the following group headings.

(1) INFECTIVE COMPLICATIONS.

As the result of the marked lowering of the resistance of the body infective lesions are both numerous and variable. The organism responsible for these complications appears to differ in certain epidemics. Thus Constantine and co-workers in a detailed study of 150 patients found the following organism incidence: *Staphylococcus* 60 per cent; *streptococcus* 12·5 per cent; *pneumococcus* 7 per cent; *B. tetragen* 3·5 per cent; anærobic organisms 3·3 per cent.

Danielopolu in a study of typhus epidemics in Roumania found the *streptococcus* as the commonest infecting organism in these lesions.

Abscess Formation.—An abscess may develop anywhere in the body but the sites of election are the subcutaneous and deep cellular tissues which have a poor resistance. In some cases there are multiple abscesses which form in remote parts of the body. The following sites of abscess formation have been described.

(a) Cephalo-cervical region: This includes the sites palpebral, lingual, retro-auricular, submaxillary and cervical.

(b) The extremities: Arm, thigh, leg and foot.

(c) Chest: Empyema thoracis may occur.

(d) Abdomen: The abscess may be either intraperitoneal or extraperitoneal. Abscesses in the spleen and prostate have been described.

(e) Perineum: Peri-anal and ischio-rectal abscesses may occur. If the abscess forms in the subcutaneous tissues its evolution may be slow and may attain large dimensions. The treatment of this complication is incision and drainage of the abscess and a small quantity of powdered proflavine is massaged into the tissues forming the wall. The wound is covered with vaseline gauze of wide mesh and finely impregnated; dressings are performed

at intervals of three days. Careful attention is given to the patient's general condition and every effort made to improve the general health and powers of resistance to infection.

Cellulitis.—This is a very serious complication—spreading cellulitis is often fatal. Constantine and co-workers described six patients who developed it with a mortality of 100 per cent. The streptococcus is the causal organism and sometimes the staphylococcus is associated with it. These patients appear not to possess any resistance to this type of infection. In the treatment of this complication measures designed to improve the general condition of the patient are instituted and chemotherapy should be employed to the maximum limit.

Inflammation of the Salivary Glands.—Inflammation may involve either the parotid or submaxillary salivary glands although the former is more commonly affected. Acute parotitis is a frequent and grave complication and suppuration often supervenes. In a series of cases studied by Constantine and co-workers there were sixteen patients with acute parotitis of which two succumbed. Nabies described thirty-two cases and nine deaths. Acute parotitis may be either unilateral or bilateral. About one-third of the cases belonged to the latter category. The streptococcus is the causal organism and the inflammation may lead to gangrene of the gland. A marked feature of the condition is the development of marked local œdema which may extend at an alarming rate. The recognition of acute parotitis during its early evolution is most important in order that treatment may be instituted to relieve intra-capsular tension which, if excessive, leads to massive disintegration of the gland. In some cases paralysis of the inferior division of the facial nerve occurs. Regarding the treatment and its complications it is necessary to avoid making large intra-capsular incisions in the gland. One or more small incisions should be made over the most prominent part of the parotid or where fluctuation is detected. It is advisable to dissect away a small flap of skin thus exposing the capsule of the gland which is then incised so as to admit a pair of Kocher's forceps which are then opened to allow pus to drain away. In some cases pus does not appear at once but it is important to diminish the intra-capsular pressure. Chemotherapy by the oral route is instituted. Radiotherapy has been advocated for acute suppurative parotitis by Latchmore and co-workers who state that the prognosis has been completely modified by high voltage X-ray therapy. These workers recommend that doses of 100 r per day be given immediately the swelling appears. This method probably stimulates lymphocytic infiltration and the formation of antibodies. The epithelial elements of the gland are not destroyed and secretion normally appears fifteen days after resolution of the swelling.

Inflammation of the Buccal Cavity and Mandible.—The following complications have been described in this region—gingivitis, gangrenous stomatitis and osteomyelitis of the mandible. In the treatment of these conditions the general treatment of the patient must be improved and oral chemotherapy may be of value. In osteomyelitis of the jaw surgical intervention may be indicated.

Inflammation of the Larynx.—Laryngitis with marked œdema is sometimes seen and suppurative chondritis leading to laryngeal stenosis may occur. In the treatment of these conditions tracheotomy may be required.

Inflammation of the Ear.—Acute suppurative otitis media, sometimes bilateral, may develop and otorrhœa is often the first symptom of the complication. Infection is prone to spread causing acute suppurative mastoiditis. In some patients the mastoiditis remains silent until there are signs of intracranial infection. Infection in the ear may lead to the development of brain abscess. In patients who recover there is frequently some residual chronic otitic suppuration. The treatment is designed to improve the patient's general condition; if suppuration is present drainage must be established. Oral chemotherapy is of value in these conditions.

Inflammation of Bones and Joints.—Reference has been made to the development of osteomyelitis of the mandible and the femur may also be affected. In these cases there is often co-existing suppurative arthritis of the knee-joint. The *Staphylococcus aureus* is usually responsible for these bone and joint complications. Treatment is designed to improve the

general condition of the patient and oral chemotherapy is valuable. Surgical treatment to provide drainage may be required.

Inflammation of Veins.—Phlebitis is a not uncommon complication and cases have been described where such veins as the orbital and saphenous are involved. In cases of acute suppurative mastoiditis there may develop lateral sinus infection leading to thrombosis. In the treatment of phlebitis the part is kept at rest. If infection or thrombosis of the lateral sinus is present the operation of lateral sinus occlusion is performed.

Septicæmia.—This serious complication carries a high mortality. In the treatment chemotherapy is most important, the choice of drug depending upon the nature of the organism cultured from the blood, and it must be given up to the maximum dose. Small blood transfusions may be of value and every effort is made to improve the patient's general health and powers of resistance to infection.

(2) VASCULAR COMPLICATIONS.

The vascular complications which occur during and after typhus fever are large in number and common. Apart from phlebitis, already referred to, the vascular lesions manifest themselves as gangrene of which there are various examples.

Gangrene of the Extremities.—The lower extremity is more frequently affected than the upper; according to Alquier thirteen times more often. A case of total gangrene of the upper extremity has been reported in the literature. Gangrene of an extremity may be either unilateral or bilateral and characteristically is of the dry variety. Dry gangrene usually occurs during the first weeks of the convalescent period and sometimes its evolution is spread over a considerable time. The gangrenous process always commences in the distal parts of the limbs and is liable to affect those areas which are exposed to cold or trauma. There has been considerable discussion regarding the causation of this type of gangrene and it is the opinion of many that it is due to progressive obliteration of the blood capillaries, arterioles and larger arteries. The syndrome has been described as the ascending gangrene of typhus fever. The treatment is amputation well above the line of demarcation.

Gangrene of the Intestines.—Croze has recorded the clinical findings in a French patient aged 30 convalescent from typhus fever. The abdomen became distended and abdominal pain was experienced. Subsequently peritonitis developed and the peritoneal cavity was opened and drained. The patient subsequently died and at autopsy there was an area of intestinal gangrene 3 cm. diameter with a perforation in the centre. In such cases of gangrene of the bowel the cause is occlusion of the blood-vessels supplying the affected segment. Treatment consists in resection of the gangrenous segment of bowel.

Cutaneous Gangrene.—Gangrene of the skin may occur and gangrene of the skin of the scrotum is commonly seen. It also occurs in the skin of the leg and arm and at pressure points in the skin overlying the sacrum and calcaneus.

Other Varieties of Gangrene.—The other forms of gangrene described as complicating typhus fever are gangrene of the vagina and the mucosa of the anal canal. In gangrene of chronic development Ferrari and Liaras recommend injections of serum from a convalescent patient. The initial dose is 20 c.c. followed at intervals of two days with doses of 30, 25, 20, 20 c.c.

(3) OCULAR COMPLICATIONS.

Complications are numerous in connexion with the ocular apparatus and include thrombophlebitis of the orbital veins, post-inflammatory atrophy of the optic nerve, corneal ulceration, dacryo-cystitis and paralysis of 3rd and 6th cranial nerves.

CONCLUSIONS.

The surgical complications which may occur during and following typhus fever are discussed under three main headings—infected, vascular and ocular. The complications of this disease are variable in regard to site incidence and their gravity. In all cases of typhus

fever close collaboration between physicians and surgeons is essential in order that surgical complications may be diagnosed during their evolution and appropriate treatment instituted as early as possible. This may prove life-saving in a disease carrying a high mortality. Since the institution of prophylactic inoculation against typhus fever it will be of interest to note whether the incidence of surgical complications is lowered and its effect upon the mortality rate. There appears to be a racial resistance to this disease. Thus it is stated the Russians have a high resistance, the French moderate and the Roumanians a low resistance, suppurative complications always occurring.

REFERENCES.

- ALQUIER, C. (1924). *Arch de l'Inst. Pasteur d'Alger.*, 522.
CONSTANTINE *et al.* (1941). *Algérie Méd.*, 207.
DANIELOPOLU, D. (1917). *La Presse Méd.*, 40, 403.
DELLEARE, and HELLUM. (1916). *Soc. Méd. des Hôp de Paris.*
FERRARI and LIARAS. (1937). *Algérie Méd.*, March.
GASTON (1917). *Montpellier Méd.*
GUILLAUME, A. (1927). *Soc. Méd. des Hôp de Paris*, 329.
LATCHMORE, A. J. *et al.* (1940). *Lancet*, 238, 497.
NICOLLE, and CONSEIL (1925). *La Presse Méd.*
TROISIER, J., and HOROWITZ, A. (1933). *Soc. Méd. des Hôp de Paris*, 151.

THE VALUE OF OPHTHALMIC TREATMENT IN THE FIELD.

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THE basis of this article is the analysis of some 514 ophthalmic battle casualties who were treated in a Mobile Ophthalmic Unit during the Libyan Campaign.

The period covered ranged from the end of the year 1941 until the beginning of 1943. The analysis was compiled from notes made in the field and these were supplemented where possible by the results given on the Follow-up Cards received from the Base Hospitals.

THE MOBILE OPHTHALMIC UNIT.

The unit was usually attached to one of the Casualty Clearing Stations of the most forward Medical Concentration Area. As far as operations would permit ALL ophthalmic battle casualties were directed to this Casualty Clearing Station.

On account of the distances involved in the evacuation of the wounded and the appalling nature of the desert tracks, thirty-six hours elapsed, on an average, between the time of the initial wound and the preliminary examination of the case in the Ophthalmic Unit. After the First Field Dressing was applied at the Regimental Aid Post the sole treatment carried out during this stage of the evacuation was the oral administration of sulphonamides at the various Field Ambulances.

On arrival at the Casualty Clearing Station the cases were "sorted" at the Reception Tent. The minor cases were sent direct to the vehicles of the Ophthalmic Unit whilst major cases were sent to the "pre-operation" ward for treatment of shock and of their other injuries and for X-ray investigation when necessary. The major cases were operated upon in the "Theatre" of the Casualty Clearing Station and usually remained in one of the wards for one or two days.

Thereafter, depending upon the severity of the injury, the case would be evacuated by air, sea or road-rail to a Base Hospital. This journey might mean another three or four days before the case again came under the care of an ophthalmologist.

Nature of Treatment in the Mobile Ophthalmic Unit.—It will readily be appreciated that, under the desert conditions outlined above, it was not possible to observe the dictum of Wurdemann "that field operations should be limited solely to the suture of lid-wounds, the removal of foreign bodies and the use of antiseptics."

Thus it was found that, although operative interference was confined to the absolute minimum, some two hundred "major" operations had to be performed.

Although the main clinical interest lies in the treatment of the battle casualty it must not be forgotten that the main military value of the Ophthalmic Unit lies elsewhere. The prevention of the evacuation of cases of minor injury or disease or errors of refraction from the forward areas to Base is the Unit's most important rôle. This point can be appreciated on studying the graph (fig. 1), which shows the relative proportions of battle casualties, ophthalmic "sick" and cases evacuated to Base.

CLASSIFICATION OF WOUNDS.

Wurdemann classified ophthalmic wounds as :—

"Penetrating" when the coats of the globe had been opened; "perforating" when the aqueous or vitreous had been tapped; and "double-perforating" when there was a through-and-through wound of the globe.

In this report a single classification has been adopted: "penetrating" when the wound

opened into the interior of the globe and "perforating" when there was a through-and-through wound of the globe.

The wounds have been arranged under the headings of the weapon, projectile, etc., that caused them. The lesion reported is the most grave noted at the preliminary examination; other complications are indicated in the notes below.

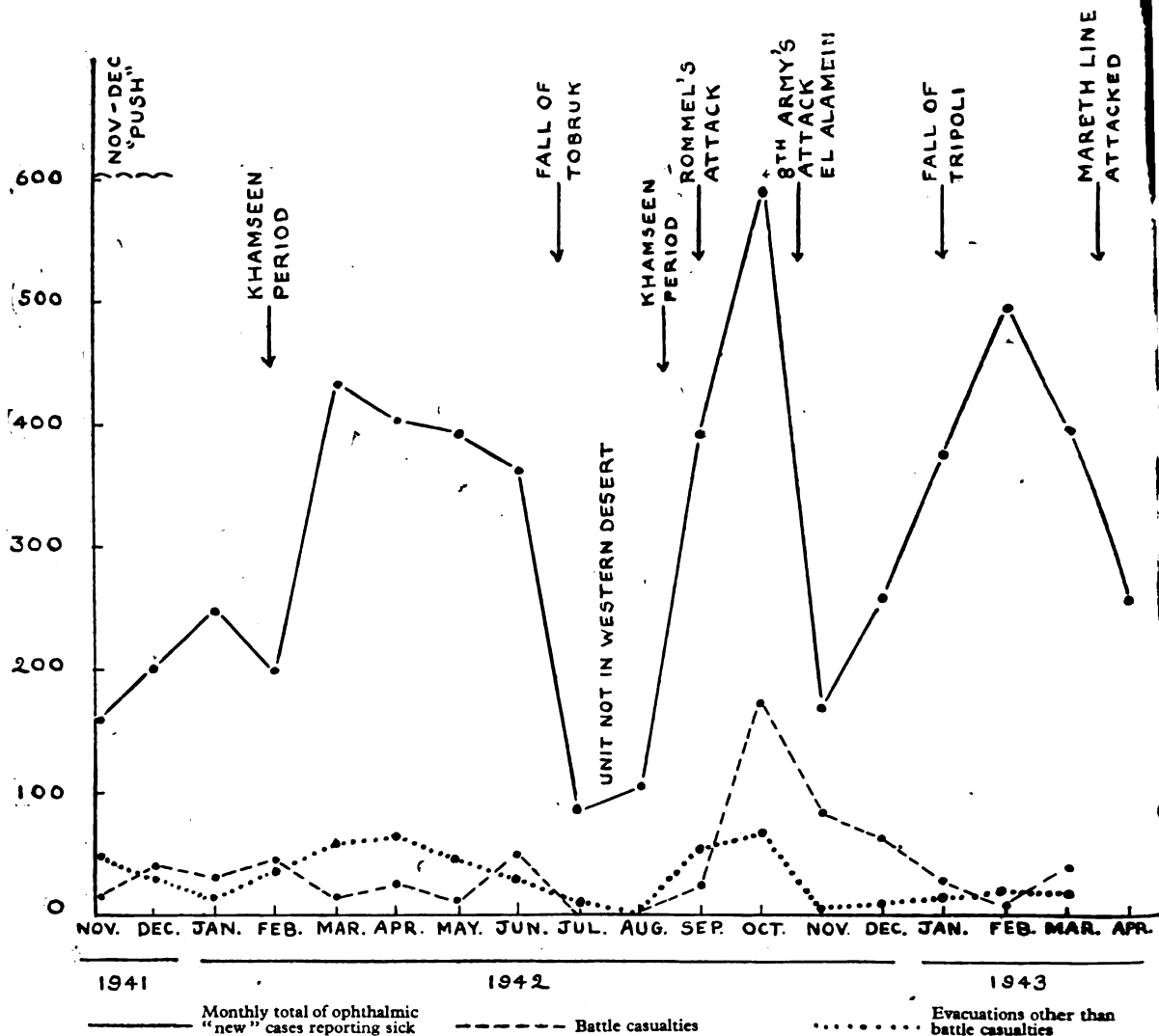


FIG. 1.

The Wounds in General.—Morax and Moreau describe the SHELL-WOUND as the most common in the 1914-1918 casualties. These wounds still retain pride of place in the Libyan Campaign with LANDMINE-WOUNDS running a good second.

The BULLET-WOUND is still locally the most destructive; in 42.5 per cent of such wounds, in this series, there was total disorganization of the globe.

The modern H.E. projectile has a particularly effective fragmentation. Thus, though the wound of the eye is often small and self-sealed, it is but one of many wounds. The majority

of the cases with these multiple injuries therefore require operation under general anæsthesia. Pentothal was found to be the best anæsthetic for use in the Field.

Some Types of Wounds.—(1) Out of 67 cases of *intra-ocular foreign body* 64 were demonstrated by X-ray. Two of the fragments were wooden and the other one which was extremely small was visible with the ophthalmoscope although the X-ray was negative.

It was soon realized that accurate localization, by means, for example, of the ring-method, was not practicable under C.C.S. conditions. It was found, however, that with the ring laid on the cocaineized limbus and a quick exposure (if the patient would remain steady) it was possible to differentiate with certainty between the intra-ocular and extra-ocular foreign body.

Some thirteen of the 67 cases with intra-ocular foreign body had the fragments removed by the giant magnet at Base Hospitals. Three to five applications of the magnet, at intervals of a few days, were often necessary before a positive result was obtained. Only one was removed in the field, i.e. at first application.

Removal by the posterior route, either through the original wound of entry or else through a scleral incision, appeared, in this series, to give less final upset of function.

This proportion of magnetizable foreign bodies is much larger than the modern use of steel-alloy led one to expect.

(2) Of the *intra-orbital foreign bodies* some 22 fragments had perforated the globe while some 31 had lodged in the orbit without penetrating the globe. Although these cases are listed under the F.B. section their main complications were the result of concussion on the globe.

Michaelson has shown sections of cases, where double perforation of the globe has occurred, in which the repair of the exit wound has been accompanied by a proliferative choroiditis with the wound being plugged by a white, button-like mass which projects forward into the vitreous.

(3) The statistics for the 1914–1918 war gave 6 per cent of all casualties as due to *indirect violence*. In this series 273 eyes have had to be listed under “effects of concussion,” i.e. approximately half of the cases.

(a) Fracture of the bony orbit combined with extensive damage to the lids was present in 87 cases and was associated with total disorganization of the globe. The remains of the eye were removed as early as the patient's general condition would permit.

(b) “Traumatic keratitis” does not appear to have been granted its full clinical status. The concussion produces ruptures of Descemet's membrane. The aqueous may then find its way between the fibres of the substantia propria and produce opacification of the cornea. Owing to the force of the explosion the globe tends to roll upwards and the site of election is therefore the lower third of the cornea. All the cases noted here were slow of resolution.

(c) Only two cases of detached retina were noted at the primary examination in the field and only six more have been subsequently reported in this series.

Sulphonamide Therapy.—The oral administration of sulphonamides during evacuation was reinforced by the routine post-operative instillation of sterile ointment into the conjunctival sac.

It is felt that this routine combined with the policy of minimal interference during the evacuation to the Ophthalmologist was a distinct advance in combating the problem of “hospital infection” in the Field Medical Units.

Sympathetic Ophthalmia.—“Many writers on the 1916–1918 casualties stressed the lessened incidence of sympathetic ophthalmia and many warned against unnecessary enucleations” (Wurde mann). In 1918 the French authorities gave reports on only 39 cases of sympathetic ophthalmia. In all of these operative interference appears to have been undertaken some considerable time (average thirty days) after the initial wound.

In the Middle East during the various campaigns it is understood that only one case (not in this series) of sympathetic ophthalmia has been reported.

Severity of the Wounds.—Eighty-five of the 514 men had sustained wounds of the two eyes. In 45 the wounds of BOTH eyes were of grave prognosis; in fact, of these, 21 have been subsequently reported as "pensionably" blind. In the remaining 40 the wound of one eye was of relatively minor import.

In addition to the 87 disorganized globes 27 eyes had to be removed at Base. Few men with major wounds of the eye were fit for front-line service again.

ANALYSIS OF CASES (See table).

(1) *Intraocular Foreign Bodies (67).*—Twenty-one of these were associated with prolapse of the iris and 5 had prolapse of the vitreous. Therefore in the field 21 operations for abscission of prolapse and formation of a conjunctival hood had to be done. Nine cases had the sclera sutured and simple conjunctival flaps had to be made for 7 other wounds. One of these abscissions had to be repeated at Base. In 3 more synechiæ had to be divided and the lens had to be removed in 7 cases. Traumatic keratitis was a complicating factor in 2 cases, while 3 cases had air-bubbles in the anterior chamber. Thirteen cases developed traumatic cataract, the fragment being visible in the lens in 8 of the cases. Lens matter appeared in the wound in 6 cases whilst the iris remained adherent to the wound edges in 4. Vitreous came forward into the anterior chamber in 1 case. Foreign bodies were visible on the fundus when examined with the ophthalmoscope in 2 cases and were visible in the iris in another 2.

Five cases developed panophthalmitis and in the large number of 13 there was "cyclitis" reported at the end of the first month. One case was reported to have "inter-retinal fluid oozing from the scleral wound"; in another "the vitreous hæmorrhage became organized inferiorly"; and in a third after a Haab +ve removal by the anterior route the anterior chamber did not reform.

Three men died from other wounds and 17 globes were enucleated.

The final reports on 14 were: vision 6/5 one case, vision 6/9 five cases, vision 6/12 one case, vision 6/18 one case, vision 6/36 one case, vision with plus 10.00 D.S. 6/18 one case, and vision with plus 10.00 D.S. 6/60 four cases.

In another 13 the results were: H.M. vision 4 cases, "good P.L." 5 cases, "C.F.I. Metre" 2 cases, "No P.L." 1 case and "recurrent hyphæma" in the other.

(2) *Perforating Intra-orbital Foreign Bodies (22).*—Five of these were associated with prolapse of the iris and in another two there was vitreous prolapse. Of the foreign bodies removed by incision one was Haab +ve and two Haab -ve.

In the Field five operations for abscission of prolapse and formation of conjunctival hood were performed and the sclera was sutured in four cases. One operation for retinal detachment was done at a Base Hospital.

Complicating factors were: 5 cases with traumatic cataract with lens matter appearing in the wound in 2 cases. Subsequently 2 cases were reported to have retinal detachment and in one "the vitreous was full of blood." Later 2 cases developed "cyclitis" and there was 1 case with posterior synechiæ. Other reports received were "iris pillars in the wound" "Synchysis scintillans—one eye." "Late macular changes" in another. "Large retinal hæmorrhage, lowered tension and scarring over macular"—one case. Two eyes were reported as with "Faint P.L. being soft eyes with vascularization of the corneæ." One case developed retinitis proliferans. Two eyes were enucleated.

For the results received as to the final function of the eyes: Vision 6/9 one case; vision 6/36 one case; vision 6/60 one case; vision 2/60 with field defect one case; "C.F.I. Metre" one case; "Vision H.M." one case. "P.L." six cases and "Blind Eye" in three cases.

(3) *Non-penetrating Intra-orbital Foreign Bodies (31).*—As has been stated previously the main damage was caused by concussion. Two cases with associated skull injuries developed optic atrophy while injury to the bony orbit produced another two cases of optic atrophy. Five had large lid injuries of which one required subsequent plastic repairs. Two of the orbits started to develop orbital cellulitis which fortunately resolved under oral sulphamide therapy. Local damage to the muscle cone produced diplopia in one case. The

NATURE OF MISSILE.

Injury	Shell	Land mine	Hand grenade	Booby trap	Bomb	Bullet	Mortar	Accidental injury	Air cannon	A.A. shell	Totals
Intra-ocular	7	13	4	5	3	1	1	1	-	-	35
Limbus	4	-	-	1	-	-	-	-	-	-	5
F.B.s	8	9	1	1	1	2	1	-	3	1	27
Perf. orbital	1	3	1	1	-	-	1	-	-	-	7
Cornea..	-	-	1	-	-	-	-	-	-	-	1
F.B.s	3	2	3	-	4	1	1	-	-	-	14
Sclera ..	-	-	-	-	-	-	-	-	-	-	-
Non-Penetrating orbital F.B.s	18	6	3	1	-	2	1	-	-	-	31
F.B.s ..	-	-	-	-	-	-	-	-	-	-	-
Conj. and scleral F.B.s	49	51	20	25	14	9	13	3	3	5	192
Disorg. globes	33	11	9	7	3	17	6	1	-	-	87
Injuries, lids and adnexa	17	2	6	1	7	1	6	3	2	1	46
Traum. keratitis	4	-	2	1	-	-	-	-	-	-	7
C. abrasion hyphaema	7	14	6	2	2	2	3	1	-	1	38
Injury to lens	1	4	1	3	1	-	-	-	1	-	11
Vitreous ham.	7	2	1	1	-	2	2	2	-	-	17
Detached retina	1	-	1	-	-	-	-	-	-	-	2
Concussion of macula	-	2	1	-	-	-	-	-	-	-	3
Comm. Retinae	-	-	-	-	-	-	-	-	-	-	-
Traum. mydriasis	1	10	2	1	1	1	-	1	-	-	17
Ocular Muscle Palsy	-	-	-	-	1	-	-	-	-	-	1
Choroid	1	1	1	-	-	-	-	-	-	-	3
Rupture of : Cornea..	4	1	1	-	2	-	-	1	-	1	10
Limbus	2	2	3	2	2	1	1	-	1	-	14
Sclera ..	4	1	-	1	-	-	-	-	-	-	6
Functional amblyopia	5	1	-	-	-	1	2	2	-	-	11
Totals	177	135	67	53	41	40	38	15	10	9	585

final results of the cases with vitreous hæmorrhages were varied. They ranged from "Vision 6/6; vitreous dust and retinal hæmorrhages" to "good P.L., vitreous and macular hæmorrhages and peripheral choroidal damage." Other reported results of these were: "Organized blood in the vitreous, vision 6/36"; "vision 6/24" one case; "vision 2/60" one case; "C.F.I. Metre" one case; "H.M." one case; "Good P.L." one case. "No P.L." one case and "block of temporal retinal vessels" in another.

(4) *Conjunctival, Scleral and Corneal Foreign Bodies* (192).—These foreign bodies were as often sand as they were metallic and the corneal fragments gave, on the whole, surprisingly little upset of vision. Only the bigger pieces were removed in the field and then only if they were very irritating. The remainder tended to work their way out unaided. One case in particular had 62 pieces counted in his two eyes on arrival at Base; his final vision was 6/24 right and left eyes.

Only two of the cases where foreign bodies were the main injury had a coincident keratitis, which supports the view that traumatic keratitis is a pure concussion effect.

One case only is reported to have developed a hypopyon ulcer which necessitated section of the cornea with final vision of less than 6/60.

The worst nebulae only affected vision to the extent of 6/36 (two eyes), 6/12 (three eyes) and 6/18 (two eyes).

Five of the scleral foreign bodies had small peripheral vitreous hæmorrhages and the effect on vision in the worst case was 6/24 and 6/12. One case with a shallow retinal detachment directly under the F.B. was missed at first examination. After operation at Base for this detachment the final vision was less than 6/60. One of the cases with a scleral foreign body developed a pyocyanus abscess which however resolved fairly quickly and without ill-effects.

(5) *Disorganized Globes* (87).—Some 52 had fractures of the bones of the orbit and 16 had gross damage to the lids. Nine of the cases had associated skull injuries. Plastic operations at Base have been reported as necessary for 26 of these cases.

(6) *Lid Injuries* (46).—Four of these have been reported to have needed plastic operation at Base. Diplopia occurred in one case where the trochlea had been destroyed and in another case following fracture of the maxilla. One lacrymal sac fistula was reported in a case with a peripheral choroidal rupture and vision of 6/24.

(7) *Traumatic Keratitis* (7).—As stated above these cases were slow of resolution, the length of time appearing to depend on the extent of the damage to Descemet's membrane. For example, two eyes slowly improved after two months but with vision reduced to 6/18 and 6/60.

Although tears in Descemet's membrane have been noted as a result of war injury "traumatic keratitis" does not appear to have been sufficiently widely recognized as a clinical entity.

(8) *Lens Injuries*.—Reports were received on only few of these. One only had vision after operation corrected to 6/60, two being less than 6/60 and one "Good P.L." Subluxation of one lens in one globe which was enucleated showed a complete iridodialysis on pathological examination.

(9) *Vitreous Hæmorrhages* (17).—Resolution of the hæmorrhages often revealed other lesions in the fundus that had been obscured at the primary examination in the field. Thus two of the cases were reported with large retinal hæmorrhages, one with a subhyaloid hæmorrhage and one with macular changes.

The effect on final function was diverse and ranged from "vision 6/6 with medial opacities," 6/12 (two cases), 6/18 (one case), 6/36 (one case), "C.F.I. Metre" (one case), "Good P.L." (two cases), down to "Organized blood in the posterior globe, blind eye" (one case). One eye was enucleated but the reasons for this have not been obtained.

(10) *Retinal Detachment* (2).—The results for these were disappointing as to function being "organization of the subretinal hæmorrhage with P.L. in lower field" and "P.L. with field defect."

(11) *Macular Changes*.—One case with a "hole" had "good peripheral vision"; this case was a released prisoner of war whose other eye had been enucleated whilst in enemy hands. One case with a macular hæmorrhage had vision of 6/18 after the first month and another with "inferior retinal changes" had a "large upper field defect."

(12) *Rupture of the Choroid* (3).—The report on one case was "6/36 and two small retinal hæmorrhages" and, on another, "6/24 with cells in the retrolental space."

(13) *Ocular Muscle Palsy* (1).—The muscle affected was the superior rectus muscle but the main interest was that the damage resulting in the diplopia did not cause any impairment of vision which was 6/5.

(14) *Ruptures of the Globe without Foreign Bodies*.—In 17 of these there was prolapse of the iris and in 5 prolapse of the vitreous. Six of these had traumatic cataracts, 4 with lens matter presenting in the anterior chamber. Four cases developed cyclitis in the third and fourth weeks.

Seventeen abscissions of uveal tissue and 5 scleral sutures were performed in the field. Two cases had lens extraction at Base. One prolapse recurred and required further abscission at Base but the anterior chamber did not reform and the result was "faint P.L."

Five globes were enucleated at Base: sections of the globes showing in one "retinal detachment" and in the other "panophthalmitis." A variety of reports on final function was received: "6/5 with iris still adherent to the wound" (one case); two cases with 6/6; one case with peripheral choroidal rupture and vision of 6/6; while two cases with the lens extracted were corrected to 6/9 and 6/60 respectively.

Vision was 6/24 and 6/36 in another two cases; one "less than 6/60"; "Good P.L." (one case); "P.L. inferior field" (one case); and in yet another there was "temporary block of the retinal vessels."

CONCLUSIONS.

If the "Follow-up" received had been complete it would have been possible to assess the relative values of the Field and Base operations and to contrast the results obtained with those which are given by Wurdemann for the casualties for 1916. In the notes above the reports received have been summarized so that a general impression can be formed as to the number of eyes which retained useful function and those which were merely "kept."

The 1916 figures gave only 698 eyes as retained out of 2,000 ophthalmic casualties. The 27 globes "subsequently removed" and the 87 globes "totally disorganized" make 114, the number of eyes "lost" to date.

This figure, it is submitted, indicates that the modern policy of forward ophthalmic treatment in the field has not had adverse end-results.

SUMMARY.

(1) An analysis has been made of 514 ophthalmic casualties from the Libyan campaign who had been treated in a Mobile Ophthalmic Unit.

(2) The types of wounds encountered and their treatment have been outlined. Sixty-seven cases with intra-orbital foreign bodies were treated; fourteen of the foreign bodies were extracted by the giant-magnet at Base. Only one was extracted in the forward area.

Twenty-two of the intra-orbital foreign bodies had "perforated" the globe.

(3) Owing to the terrain some 200 men had to be operated on in the field unit.

(4) It is suggested that "hospital infection" has been limited by the local as well as oral administration of sulphonamides combined with a policy of "minimal interference" in the Field Medical Units. No cases of sympathetic ophthalmia have been reported from this series.

(5) Eighty-five of the cases had been wounds in both eyes. In 45 the wounds of the two eyes were of grave prognosis and in 21 the men have been subsequently reported as "blind."

(6) Total disorganization of the globe occurred in 87 cases and the eyes were removed at

the Mobile Unit. A further 27 eyes have been reported to have been removed at Base Hospital.

(7) It is submitted that by general comparison with the statistics for the 1914-1918 war the results obtained for this campaign have not been adverse.

My especial thanks are due to 7262698 Private L. Baker, R.A.M.C., for his skilful and devoted nursing of the cases in the field and to those of my colleagues who have made this article possible by sending back the "Follow-up" cards.

REFERENCES.

- Injuries.*—WURDEMAN. "Ophthalmic Injuries."
Traumatic Keratitis. HUDSON (1920). *T.O.S.*, **11**, 254.
JULER (1934). *P.R.S. Med.*, **28**, 190.
STALLARD (1943). (Personal communication).

ON THE IMPROVISATION OF EQUIPMENT FOR AN EYE DEPARTMENT

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SINCE eye departments, like others in war-time, are subject to all the vicissitudes of supply under the strain of bombing and submarine attack, the measures that have been adopted to overcome various shortages may be of interest to others. In the running of four different eye departments at home and abroad wide variations have been met in the equipment available and gratitude is due to the quartermasters and handymen of these hospitals for the skill and ingenuity which they have brought to bear on the solution of these problems.

I.—OPHTHALMOSCOPE AND RETINOSCOPY MIRROR.

Some things can scarcely be improvised: a trial set of some sort is a necessity; yet much may be done even with a small retinoscopy set if it includes at least a half set of cylindrical lenses. The ophthalmoscope may be only the simple concave mirror and a convex lens from the trial case while a retinoscopy mirror can be made from an old dental mirror by drilling a hole through the metal cover and scraping off some of the silvering. I have had to use a lady's vanity mirror in similar fashion.

II.—DISTANCE ACUITY TEST-TYPES.

The next requirement is some method of measuring the acuity of vision. If news bills can be obtained, specimens of type of all sizes can be pasted on to a sheet of white board. The appropriate sizes are easily calculated by reference to a book of tangent tables borrowed from an R.A.F. or Artillery unit. Another easily constructed acuity test chart is the familiar "U" test, which is of course invaluable if numbers of illiterate soldiers, such as native troops, have to be tested. The "U"s are painted in white on square matt black cards and a fine black thread is run right round the reverse side. This thread makes a loop at each edge so that the card may be hung in any position from a nail in the centre of the board. An important point is that only one "U" is shown at a time.

III.—DISTANCE TEST-TYPE HOLDER AND TEST-TYPE ILLUMINANT (FIG. 1).

In the absence of a revolving drum of test-types, a convenient holder can be made which allows for three (or more if desired) test charts being available, only one of which is shown at a time. The design is shown in the diagram. Two wooden slats, 10 mm. (say) thick are nailed to the wall, parallel to each other and horizontal. Their length is rather greater than three times the width of the test chart and they are separated by a distance equal to the length of the test chart plus a centimetre. A thin strip of wood of the same length is then nailed to the outer side of each slat so that the upper strip overlaps its slat for 12 mm. in a downward direction and the lower strip projects 9 mm. above the lower slat. If the cards are then slipped in, upper end first, it will be found that they are held in position by the overlapping strips and yet can be easily removed for changing. The two cards not in use are placed face to the wall with the other in the centre. As the charts available were of thin paper they were pasted on to sheets of fibre board to obtain the necessary rigidity. The thickness of the slats must be sufficient to allow for this.

The test-types may be illuminated by home-made reflectors (M & B 693 tins are a convenient size). At least two are necessary. The bulb-holder is fixed through one side and the lid of the lower one is pierced by a 1-2 cm. hole for use in retinoscopy. When this is

to be carried out both lids are replaced and the lower lamp swung round to face the observer. The lamps themselves are carried in simple brackets hinged at the wall or (as in the one illustrated), may be made with heavy bases to stand on a convenient shelf.

IV.—NEAR VISION TEST-TYPES.

Test-types for measuring the acuity of near vision can be made by cutting out short paragraphs of type of varying sizes from old books, newspapers, or pamphlets. Timetables will

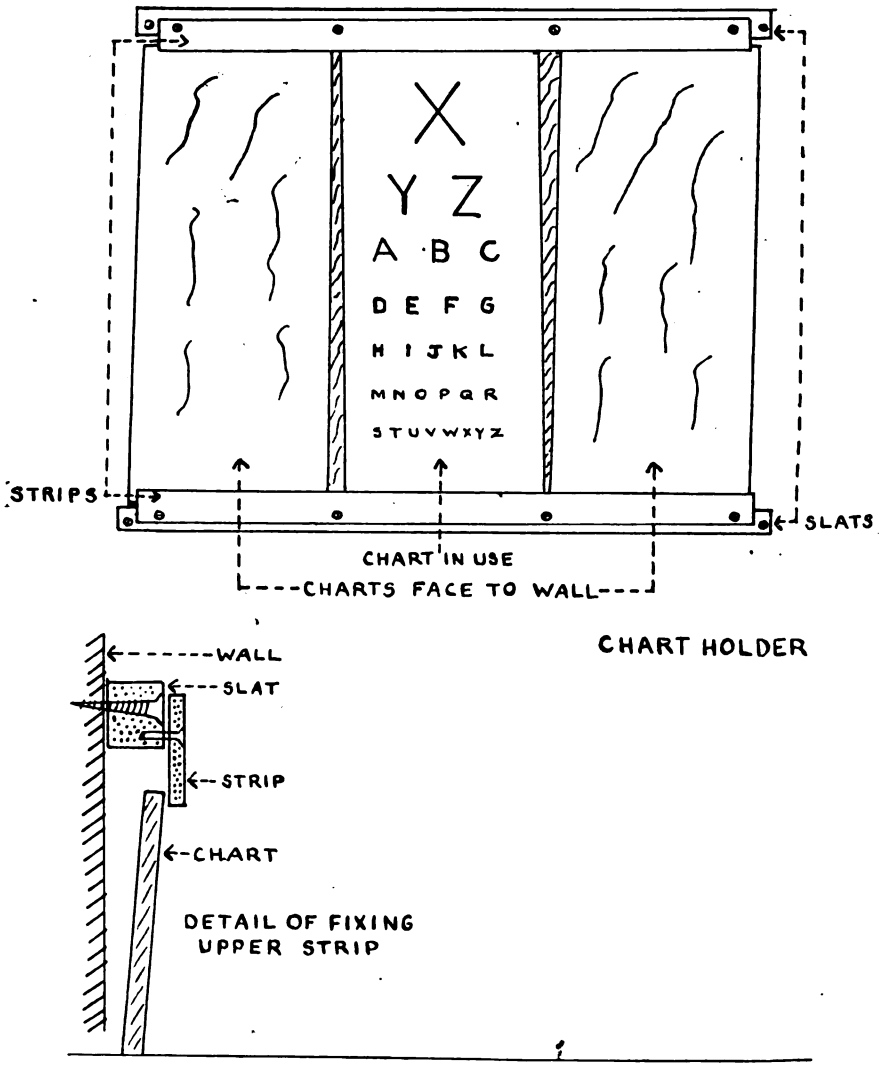


FIG. 1.—Distance test-type holder. Three charts are shown, only one of which faces the subject.

be found useful for the smaller sizes but it is important that they should be on opaque paper so that the type on the other side does not show through when pasted on to a card.

V.—SUBSTITUTE FOR BJERRUM SCREEN.

No elaborate Bjerrum screen is required to test the central field of vision if recourse is made to the original method of using the back of the consulting room door.

A drawing pin is thrust into the centre of a large blank area, preferably painted matt black or covered with black cloth, although even a light coloured wall may be used. The position of the centre is such that it is directly at the eye level of a tall patient on the lowest chair. Smaller patients are then brought to the necessary height by adjustment with cushions or the use of higher chairs. The radii of concentric circles subtending angles of 5° , 10° , 15° , 20° and 25° at a distance of either one or, preferably, two metres are calculated by recourse once more to the tangent tables. Lengths of string corresponding to these measurements are fastened at one end to the central pin and at the other to a pencil. They are then swung concentrically to mark out the circles. Finally at least two straight lines (the vertical and the horizontal) are drawn, passing through the centre. Others may easily be constructed with the use of the pencil, drawing-pin, string, a ruler and one's memory of geometry.

Test discs varying from 1 mm. to 40 mm. in diameter can then be cut out of clean stiff paper and pasted on to the end of fine, stiff and blackened wire.

If the wall is light in colour, the discs should be coloured red, green or black but it will be found that the results with the smaller discs are less sure than with a blackened background.

VI.—CLINICAL PERIMETER (FIGS. 2 AND 3).

A clinical perimeter may also be constructed fairly easily. The diagrams indicate the method.

A board which can bend easily is required, 1,200 mm. long by 70-100 mm. wide. A hole is made in the exact centre, wide enough to pass a bolt easily. The head of the bolt is counter-sunk into the board. Notches a few millimetres deep are cut in each edge, exactly 67 mm. from either end. A string 660 mm. long is slipped over the board, when it has been carefully bent over into a half-circle, so that it holds the board in position at the notches. (A ring through which the patient looks may conveniently be placed in the exact centre of this cord.) The whole board is painted a matt black and then its outer surface is marked off into eighteen equal divisions by thin transverse white lines, each representing ten degrees of arc from the central hole to the notches.

A stand to hold the half-circle is constructed from two boards firmly fixed at right angles to each other; it is necessary to ensure that the whole will not topple over in any position of the half-circle. The axis of the half-circle is so arranged that, while permitting free movement, the friction is sufficient to hold it in any set position. The block marked "A" materially assists in this. The third diagram shows how the tangential axes are fixed by centering the mid-line drawn along the half-circle with 30° , 60° , 90° , 120° , 150° , and 180° axes drawn on the back of the vertical support. A chin rest may be an elaborate construction or only an old crutch.

VII.—SPECIAL LENSES.

The tiny set of trial lenses, which was all that was available at one time, did not include a Maddox rod, a pinhole or stenopæic disc. The latter were cut in pasteboard of the same diameter as the trial lenses but the first was roughly approximated by using a red glass and high cylinder in combination. A red lens was substituted by a piece of red cellophane used for wrapping confectionery.

VIII.—AXIS-FINDER.

To determine easily the axis of the patient's spectacles, a cross was drawn on the wall. The spectacles were then held as close as possible to and parallel with the trial frame and the axis read off on the trial frame protractor when the tilt of the spectacles was sufficient to produce no deviation of the image of the upright line of the cross as seen through the spectacles.

A trial frame has always been available but this might be constructed from strong wire. Three different sizes should be made, with P.D.s of 58, 64, and 68 mm.

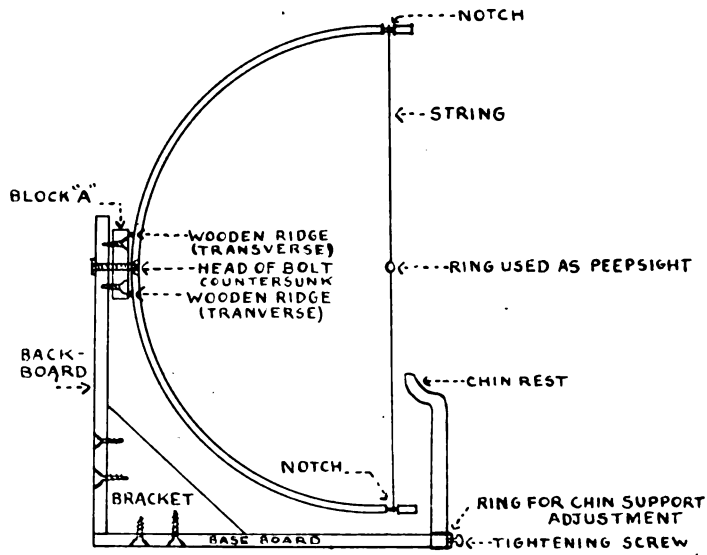


FIG. 2.—Clinical perimeter (side view). The arc of the perimeter must be carefully adjusted with the little transverse ridges shown which run over the block "A." All screws should be countersunk.

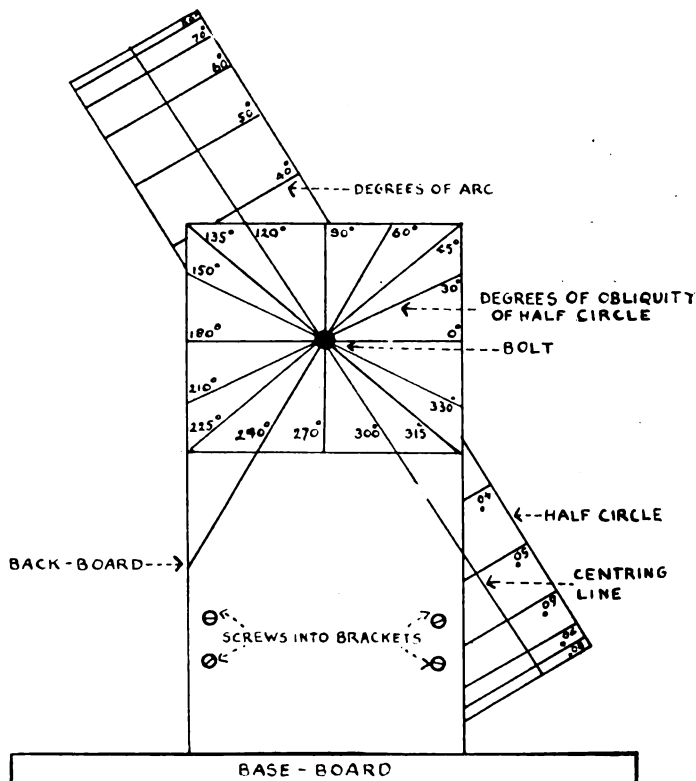


FIG. 3.—Clinical perimeter (back view). This illustrates the method of placing the perimeter at any desired angle with the horizon.

IX.—SLIT-LAMP AND CORNEAL MICROSCOPE (FIGS. 4, 5 AND 6).

A slit-lamp of clinical value is not difficult to make : the photographs show one built to my design. This made use of the lenses from the trial case ; two spherical lenses of plus 20 dioptres placed with their more curved surfaces face to face, as the condensing system, the 1 mm. stenopæic disc as the slit and a 10 dioptre lens as the illuminating lens. These lenses were so arranged that they could easily be removed to use in the trial set. The illuminant was a 6-volt motor car bulb with as nearly linear a filament as possible. It was mounted with the filament vertical in an old cycle lamp case which could be rotated round a vertical axis. The condensing lenses and slit were carried in a tube capable of backward and forward movement so that the filament of the lamp might be brought within the focal length of the rear lens of the condensing system. The slit could be rotated a few degrees on either side of the vertical. The illuminating lens was mounted on a simple carrier which permitted of up and down movement as well as to and fro ; but neither movement is essential if the distance of the illuminating lens from the slit is accurately determined by calculation or experiment (the image

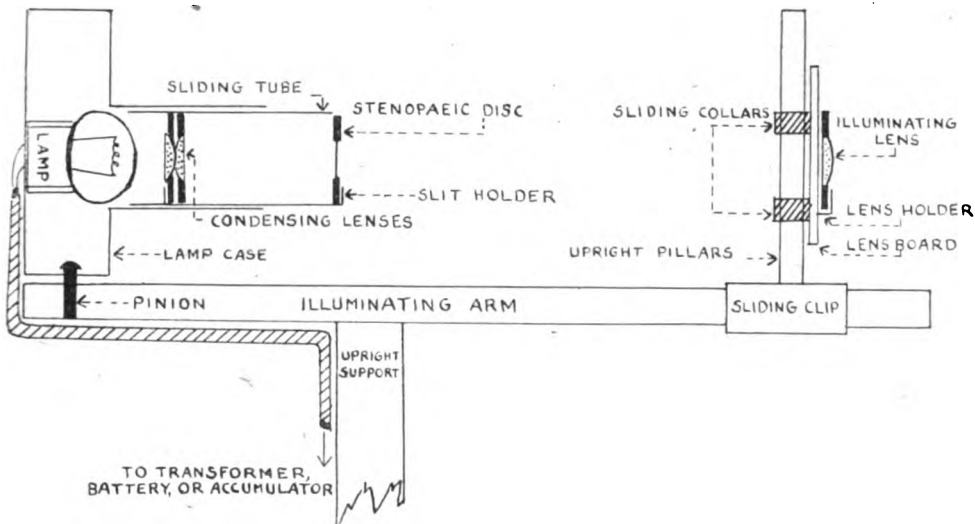


FIG. 4.—Slit-Lamp (lamp case shown in section). This diagram illustrates the principle of the slit-lamp. The mounting of the illuminating lens, shown here, is simpler than in the apparatus in subsequent photographs.

of the filament formed by the condensing system should fall on the posterior surface of the illuminating lens).

The apparatus has been rigorously simplified to allow of robust construction and it will be noticed that no provision has been made for varying the height of the illuminating arm. This would not have been difficult to do but was omitted in the interests of rigidity. An adjustable head rest was used to obtain the requisite variations.

A binocular corneal microscope to use with the slit lamp is ideal but, if not available, one may be made, again with the use of lenses and prisms from the trial set, and will function satisfactorily at a fixed focus. A binocular loupe may be used, or even the monocular, since it is the method of illumination that is the greatest feature of the system.

X.—DRY HEAT LAMP AND SOLUTION DROPPERS.

The apparatus required in the treatment of eye disease seldom requires improvisation. An electric lamp reflector mounted on a handle which the patient holds in his hand was

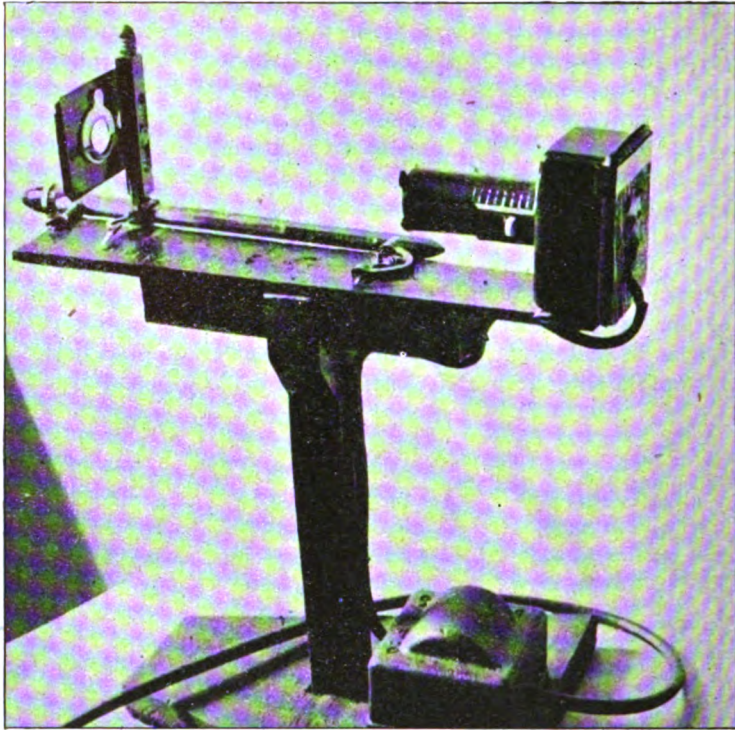


FIG. 5.—Slit-Lamp, photographed from slightly to the rear. The slip-in arrangement for the illuminating lens is clearly seen. It would, however, have been better to have been mounted on the front of the carrier instead of the back as here.

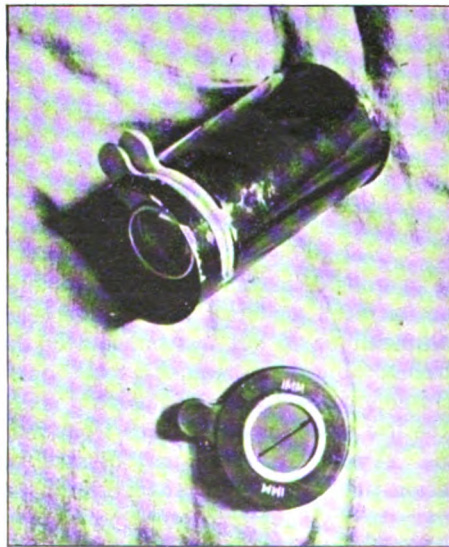


FIG. 6.—Slit-Lamp, detail of sliding tube. The two condensing lenses have been slightly separated, and the slit (stenopaic disc) has been laid at the side. The rim holding the condensing lenses in position can just be seen.

found fairly satisfactory. Previously a small electric fire mounted on an adjustable stand was used but, when the element burnt out, it could not be replaced.

Drop bottles for sterile solutions may be made from wide thin glass test-tubes firmly stoppered with corks through which passes a short capillary tube. The warmth of the hand is sufficient to expel a drop at a time. A little gauze hood (sterile) is dropped over the nozzle after use.

XI.—NIGHT VISION TEST (FIGS. 7 AND 8).

Finally a description might be given of an apparatus developed for a special purpose. An extensive investigation into the nutritional state of the African soldier required a careful

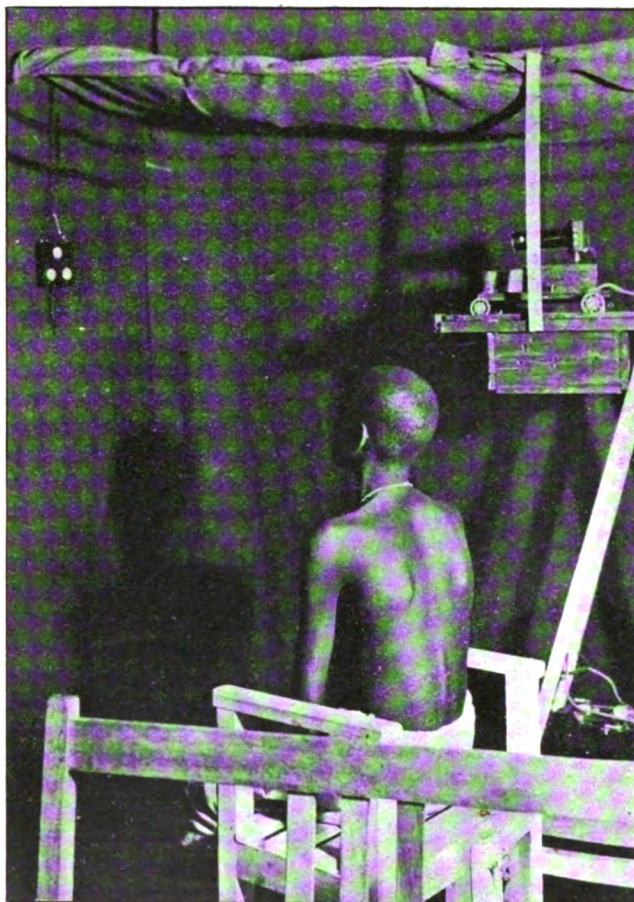


FIG. 7.—Night-vision test. Note that the screening blankets have been drawn aside and that the patient is shown rather further from the domino than is advisable. The lamp is seen mounted on its little trolley at its nearest point of approach.

assessment of the night vision in large numbers of illiterate and often simple-minded persons. An apparatus was therefore developed capable of testing large numbers quickly and which would afford scientifically comparable results. It could be used to investigate two different factors: (1) the rate of dark adaptation, and (2) the absolute threshold of vision. It was necessary that it should be simple both in use and in interpretation as only limited material was available.

The light was a small torch bulb as no more reliable source was available. This

was run from a 120-hour accumulator for the middle part of its charge only. The torch bulb was partially blackened and mounted in a non-reflecting carrier with a long light-directing tube capped with filters of old cleared X-ray film. The filters acted as a diffusing screen and spread the light evenly over the surface illuminated. The entire carrier was mounted on rails so that it could be moved back and forward a distance of seven metres by a continuous cord running over pulleys. The variation in intensity of illumination on the fixation objects was achieved simply by varying the distance of the source, thus eliminating any error from colour variations. The test-objects were large matt black dominoes with matt white painted hollows 1 inch in diameter. There were three of these dominoes with one, two and three "spots" respectively. These were hung up in the dark in the line of the beam of light, but directly facing the patient who was seated two feet away and slightly to one side in order to avoid any chance of reflections. In the case of the multiple spots the images of the spots fell

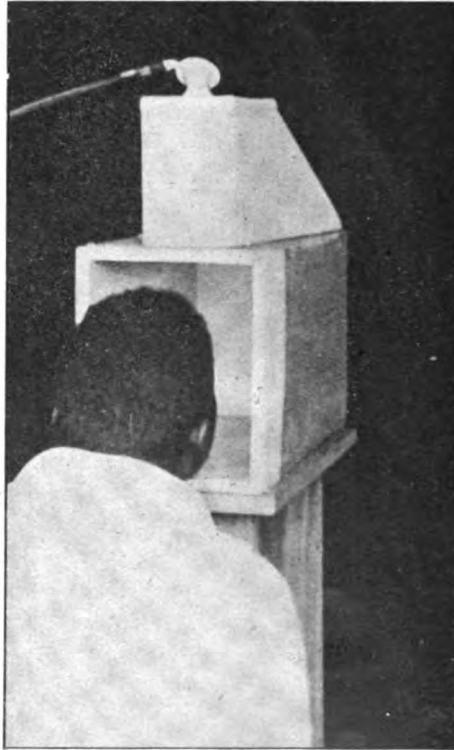


FIG. 8.—Light Saturation Apparatus. The brilliant and evenly illuminated box is here shown. The patient must have his head well into the box to ensure thorough saturation. The lamp is housed in the turret top above the box and screened from his direct observation.

outside the macular area while, if one spot only was in use, the constant "searching" movements of the eyes were adequate since the lamp was not moved up rapidly. The dominoes, known to him by touch, could be silently changed by the operator in the dark without the patient's knowledge. The room was arranged so that a light trap at the door permitted the operator to pass in and out; results were recorded outside by a clerk to whom they were called.

The system was that the patients, after having the apparatus shown to them and its working explained, were left in complete darkness for half-an-hour. The operator then returned and called them one by one to the seat before the dominoes. Those still waiting

remained seated with their backs to the apparatus which was carefully screened both from them and from the patient under test. Each time the apparatus was started at the full distance from the dominoes and brought up in steps of 25 cm. to the farthest point at which the illumination was sufficient to enable the subject to tell the number of spots. The nearest point the apparatus could approach was 1 metre, thus giving a variation of up to thirty-five times the minimum intensity. It was considered that this gave an adequate range to eliminate all cases of night blindness. The number of filters in the cap was adjusted so that a control subject with excellent night vision could just distinguish the number of spots after one or two steps only had been made. Once this was done the number of filters was kept constant. The few who failed to see the spots within this range were considered to be grossly night-blind.

After the "light minimum" had been determined the patient went outside to stand in the sunshine for twenty minutes. Each was then taken in turn to an apparatus for light saturation—a matt white painted box with a strong light in the roof invisible to the patient. Two minutes in this was found adequate but spectacles must not be worn. The patient then at once proceeded through the light trap and was guided back to his seat in front of the dominoes. The time from the moment he left the light-box until he could correctly name the domino was measured in seconds. For this purpose the lamp was moved up to its nearest point and another cap with less than half the number of filters used. The number was adjusted so that a person with good night vision could just count the spots in ninety seconds. It was considered that this gave a fair measure of the rate of dark adaptation.

The results of tests with this apparatus will be published elsewhere but they had a consistency which suggested that the method was adequate for the purpose in view.

SUMMARY.

Simple methods of improvising the following apparatus have been described : (1) Ophthalmoscope and retinoscopy mirror ; (2) distance acuity test-types ; (3) substitute for revolving test-type drum ; (4) illuminant for test-types ; (5) near vision test-types ; (6) substitute for Bjerrum screen ; (7) a clinical perimeter ; (8) Maddox rod, pin-hole and stenopæic disc ; (9) axis finder ; (10) slit lamp and corneal microscope ; (11) dry-heat lamp and sterile solution droppers ; (12) night vision test.

This paper is forwarded by courtesy of Brigadier Cormack, *O.B.E.*, and Colonel Bell, *O.B.E.*, *E.A.A.M.C.*, to both of whom thanks are due for their interest and encouragement.

POISONING WITH BARIUM SULPHATE CONTAMINATED WITH ARSENIOS ANHYDRIDE.

WITH A MODIFICATION OF SANGER AND BLACK'S METHOD OF ANALYSIS.

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AND

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THE methods, and modification of existing methods, employed in the investigation of two cases of poisoning with arsenic as carried out in a Mobile Laboratory not equipped for toxicological investigations, are described.

CASE HISTORIES.

Two native patients were given a barium meal. The male patient, who had had a gastro-enterostomy operation performed fourteen days previously, died six hours after the barium meal had been given. He showed symptoms of severe diarrhoea, abdominal pain, vomiting and collapse, which began four hours after the barium meal had been given. The female patient, who had had a previous history of cholecystitis, had no symptoms till twelve hours after the barium meal when she commenced to have a little vomiting. Vomiting, abdominal pain and diarrhoea became severe about twenty hours after the meal had been given and she died about twenty-four hours after the death of the male. Neither patient made any comment at the time of the barium meal, not that any comment would be expected as arsenious anhydride has a slightly sweet taste.

INVESTIGATIONS.

The meal was mixed by a radiographer from the powder from a bottle alleged to have been sealed, with the makers' label and stamp, weight of contents, etc. Bettendorf and Gudzeit tests and the hydrogensulphide precipitation tests were carried out on the contents of this bottle and they were all found to give a strongly positive result. Further chemical tests revealed that only barium sulphate and arsenic were present in the bottle of barium sulphate and that the arsenic was in the form of arsenious anhydride.

The arsenious anhydride (As_2O_3) was then separated from the barium sulphate. (This can be done relatively simply since arsenious anhydride is soluble in potassium carbonate in the cold.)

The next problem was to perform a quantitative estimation of the arsenious anhydride present. The classical method of estimation by weight could not be done, as no Gooch crucible was available, and a method in keeping with the equipment of a Mobile Laboratory had to be devised. As we were dealing with a pure substance it was thought that a reversal of the method employed in the standardization of iodine solutions with arsenious anhydride would yield a satisfactory result. Experiment proved this method to be satisfactory. An iodine solution was standardized with sodium thiosulphate and the arsenious anhydride was then titrated with the standard iodine solution. The end point of this titration was good and it was possible to establish that the contents of the bottle of barium sulphate used to mix the barium meal contained 16.30 per cent of arsenious anhydride.

Post-mortem Examination.—The body of the female patient was exhumed for post-mortem examination after three days' burial in dry sandy soil with no coffin. There was no

smell of putrefaction but a not unpleasant cheese-like smell. The abdominal wall showed no signs of putrefaction and the abdominal fat and muscles were in a state of preservation similar to that which we notice a few hours after death in hot climates. The thoracic cavity and contents showed no pathological changes. The contents of the stomach and duodenum, the small intestine and the large intestine were collected separately.

The stomach contained 270 c.c. of dark brown fluid in which was suspended much particulate matter of the barium meal. The dark colour of the fluid was due to altered blood. On opening the stomach, there was a marked hyperæmia in the pyloric region which had the appearance of the raised nap of scarlet velvet. This colour faded as one passed into the duodenum and jejunum. The jejunum and ileum contained 240 c.c. of dark yellow fluid in which was some powder of the barium meal. There was a small amount of congestion of the mucosa of the ileum.

The large intestine showed a slight congestion of the mucosa which was limited to the proximal end. The contents of the large intestine had the appearance of a stool from a case of severe diarrhœa, with much mucus, and was 70 c.c. in volume. There was a quantity of the residuum of the barium meal in the large intestine. The liver showed a slight patchy and focal necrosis but, apart from this, none of the other organs showed any gross abnormality.

Chemical Examinations.—To identify and estimate the mineral poison in bowel contents all organic substances must be destroyed and the mineral transformed into one of its most oxidizable compounds. Three methods are possible.

The method *par excellence* is that which employs the electrolysis of nitric acid. This was impossible in a Field Laboratory. There remains the method of digesting the bowel contents with a mixture of hydrochloric acid and potassium chlorate or the method of digestion with fuming nitric acid. The latter method was chosen. The bowel contents are heated with fuming nitric acid. This requires large quantities of fuming nitric acid so we treated the specimen with nitric acid of sp. gr. 1 : 4 and heated slowly. After all the substances had been brought into suspension and partial dissolution, fuming nitric acid was added little by little. (This has to be added with great care as much water is held up in the carbon at the bottom of the basin with a fairly active reaction on adding the fuming nitric acid.) By this method all organic substances are destroyed and there remains only a few c.c.s of clear fluid. After cooling, concentrated sulphuric acid was added to eliminate the nitric acid and finally a solution of sulphuric acid containing the acid of the mineral salt was obtained. This was decanted and the insoluble barium sulphate settled to the bottom of the tube leaving a clear supernatant fluid, in this case sulphuric acid containing arsenic acid.

This method of extraction was carried out on the contents of the stomach and intestines. The stomach and intestines themselves were similarly treated. (All acids used in the extractions were arsenic free.)

For the further investigation of the arsenic content of the bowel, either the method of Sanger and Black or the method of Marsh-Leigbig may be used. The former is the easier to manipulate and we found that it was simple to make a satisfactory colour scale and that, by using this method, we could estimate 0·000001 gramme of arsenious anhydride. Sanger and Black's bottles were readily made from odd pieces of glass tubing and bottles. To make the standards a 0·1 per cent solution of arsenious anhydride was made (i.e. 1 c.c. of this solution contained 1 mg. of As_2O_3). Of this we took 0·1 c.c. and made it up to 1 litre. Eight standards were then made from 0·000001 gramme per cent up to 0·00008 gramme per cent.

The exact method employed in making the standards was as follows: Schleiber filter paper was impregnated with mercuric chloride. This paper was cut into ribbons (5 cm. by 25 mm.). Each ribbon was introduced into a piece of glass tubing. All tubing was of identical diameter and length, these glass tubes being essentially similar to the tubes on the Sanger and Black bottles. These tubes were sealed by flame at one end and each paper was then exposed to the effects of a known quantity of arsenious anhydride in a Sanger and Black bottle using the technique described by Sanger and Black. It was found that the lowest

dilution of the arsenious anhydride standard solution (0.000001 gramme per cent) produced a yellow colour and that the other dilutions produced a good range of colours from dirty yellow, reddish, then up to dark red and red brown. Not only did the colours vary satisfactorily with each concentration but the area covered by colour varied. Thus with the lowest dilution just the lower edge of the ribbon of paper was coloured while the area became greater with increase in concentration and, with the highest concentration used (0.00008 gramme per cent), the entire ribbon of paper was stained.

Before each estimation of the unknown was made, a preliminary trial was carried out to see, firstly, if arsenic was present and also to see what colour was produced on the paper in the Sanger and Black bottle so that a suitable dilution could be made which would bring the colour produced within the range of the standards.

For the estimation, three Sanger and Black bottles were set up. In the first and second bottles were put known quantities of the fluid under estimation, e.g. 0.2 c.c. and 0.3 c.c. of the duly diluted unknown. The third bottle was used as a control. The resulting colours of the reaction were compared with the standards and a match was made. With the above methods the following results were obtained.

					<i>Grammes per cent of arsenious anhydride</i>
Stomach and Duodenum Contents	..	..	..	..	0.02
Small Intestine Contents	..	..	..	..	0.12
Large Intestine Contents	..	..	..	..	0.005
Arsenic fixed to the Mucosa of the Stomach and Duodenum	..	..	..	..	1.40

CONCLUSION.

The analyses which were done were sufficient to prove that death was due to poisoning with arsenious anhydride which was admixed with the barium sulphate of the barium meal.

No accurate figure can be given but it is estimated that the deceased were given about 8.9 grammes of arsenic anhydride. The variation in the time of death of the male with a previous gastro-enterostomy and of the female who was the "gall bladder type" are noted.

A modification of Sanger and Black's method for estimation of arsenic quantitatively is described.

We wish to thank D.M.S., East African Command, for permission to forward this article.

Editorial.

CANNES.

SCENE OF THE FIRST CONFERENCE OF THE LEAGUE OF RED CROSS SOCIETIES,
APRIL, 1919.

CANNES is not an ancient town nor one endowed with a great history. It is true that there had existed there a small village or townlet from the most ancient times, a little place which had had its own experiences. It was twice destroyed by the Saracens in the eighth and tenth centuries and the Man in the Iron Mask languished in the prison of a nearby island, Ste. Marguerite, from 1687 to 1698. It was destined, indeed, to be the landing place of Napoleon when, on March 1, 1815, he returned to France from Elba. But there was no great township in those days. The little place was as small and as self-sufficient as any of the localities along the Riviera coast. It was not until Lord Brougham found it in 1834 and popularized it that it began to attract the attention of visitors but the climate was then found to be excellent, the surrounding country beautiful and it soon became one of the largest and most popular seaside resorts of the Department of the Alpes Maritimes, with a population of nearly 40,000.

On April 1, 1919, Cannes was at the height of its glory. Having come successfully through the four years of a great European conflagration it was now the chosen city where Mr. Henry P. Davison, Chairman of the American Red Cross Council, had elected to organize a Conference of Red Cross Societies from each Member State of the victorious Allies. It was hoped, also, by the more benevolent of the American and British Members, to admit, in the fullness of time, representatives of the defeated Germanic Powers to a League which could not conceivably do any Member-Nation harm and which might do each a great deal of good. Large and luxurious hotels had been invited to proffer hospitality to the assembled scientists and everything was full of promise for the future health of the world.

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Emile Roux of the Pasteur Institute had been appointed President and Dr. William Henry Welch ("Popsy" as he was affectionately called by his familiars) was Chairman of the

dilution of the arsenious anhydride standard solution (0.000001 gramme per cent) produced a yellow colour and that the other dilutions produced a good range of colours from dirty yellow, reddish, then up to dark red and red brown. Not only did the colours vary satisfactorily with each concentration but the area covered by colour varied. Thus with the lowest dilution just the lower edge of the ribbon of paper was coloured while the area became greater with increase in concentration and, with the highest concentration used (0.00008 gramme per cent), the entire ribbon of paper was stained.

Before each estimation of the unknown was made, a preliminary trial was carried out to see, firstly, if arsenic was present and also to see what colour was produced on the paper in the Sanger and Black bottle so that a suitable dilution could be made which would bring the colour produced within the range of the standards.

For the estimation, three Sanger and Black bottles were set up. In the first and second bottles were put known quantities of the fluid under estimation, e.g. 0.2 c.c. and 0.3 c.c. of the duly diluted unknown. The third bottle was used as a control. The resulting colours of the reaction were compared with the standards and a match was made. With the above methods the following results were obtained.

						<i>Grammes per cent of arsenious anhydride</i>
Stomach and Duodenum Contents						0.02
Small Intestine Contents						0.12
Large Intestine Contents						0.005
Arsenic fixed to the Mucosa of the Stomach and Duodenum						1.40

CONCLUSION.

The analyses which were done were sufficient to prove that death was due to poisoning with arsenious anhydride which was admixed with the barium sulphate of the barium meal.

No accurate figure can be given but it is estimated that the deceased were given about 8.9 grammes of arsenic anhydride. The variation in the time of death of the male with a previous gastro-enterostomy and of the female who was the "gall bladder type" are noted.

A modification of Sanger and Black's method for estimation of arsenic quantitatively is described.

We wish to thank D.M.S., East African Command, for permission to forward this article.

Editorial.

CANNES.

SCENE OF THE FIRST CONFERENCE OF THE LEAGUE OF RED CROSS SOCIETIES,
APRIL, 1919.

CANNES is not an ancient town nor one endowed with a great history. It is true that there had existed there a small village or townlet from the most ancient times, a little place which had had its own experiences. It was twice destroyed by the Saracens in the eighth and tenth centuries and the Man in the Iron Mask languished in the prison of a nearby island, *St. Marguerite*, from 1687 to 1698. It was destined, indeed, to be the landing place of Napoleon when, on March 1, 1815, he returned to France from Elba. But there was no great township in those days. The little place was as small and as self-sufficient as any of the localities along the Riviera coast. It was not until Lord Brougham found it in 1834 and popularized it that it began to attract the attention of visitors but the climate was then found to be excellent, the surrounding country beautiful and it soon became one of the largest and most popular seaside resorts of the Department of the Alpes Maritimes, with a population of nearly 40,000.

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Emile Roux of the Pasteur Institute had been appointed President and Dr. William Henry Welch ("Popsy" as he was affectionately called by his familiars) was Chairman of the

Executive Committee. Roux, however, very old and very ill, was forced to leave early in the proceedings and Welch became the actual head of the Conference. There could not have been found a better or more learned President. Even before the Conference opened, however, there were signs of an ominous intention, on the part of certain delegates, to introduce controversial matter.

"The French," wrote Welch in his diary on March 31, quoted in his "Life," (1941), by Simon and James Thomas Flexner, "inject a bombshell by determination to record their decision not to have anything to do with an international organization which includes Germans." We recollect how very distressing this point of view was to the Americans, and indeed, to the British delegates. They held, rightly or wrongly, that an International League of Health should include, in the future, those nations which, though at present our enemies, had still produced in pre-war days such men as Robert Koch, Virchow, Ehrlich, and might still deliver facts, observations and, above all, men to further the work in hand. "Davison is disturbed by the attitude of the French delegates," wrote Welch, "but I think he exaggerates its importance." "Welch's methods," say the Flexners, "of dealing with this outcropping of the old Adam was to ignore it." He arranged to have a meeting of the Executive Committee the following morning to allow Roux, Widal and Rist to put their Resolution on record, which they duly did. This part of the business settled, Welch allowed the Conference to proceed without further consideration of their rather upsetting views. "The objection, having been noted, was forgotten and, when the League of Red Cross Societies was eventually organized, the Germans as well as the French were Members."

In view of subsequent history and the fate of Cannes itself under the German heel it remains a question whether Roux, Widal and Rist were not right after all! But there is no doubt that the Americans and the British intentions were the more generous! Welch, at the first Meeting, spoke as follows: "We who have been joined together in close association during this war in fighting the common enemy, an enemy of civilization, are to continue in closer bonds of friendship because we are joined together not to forge weapons of destruction but united to consider what we can contribute for the healing of the Nations." These eloquent and kindly words received a great ovation and the League of Red Cross Societies was founded amid general enthusiasm.

We may remind our readers that it still exists but its activities have greatly lessened with the flight of time. "The Conference had laid down a comprehensive plan for world health improvement which entirely overlooked the question of feasibility." So say the Flexners in commenting on Welch's part in it. Alas! that it should be so; but Conferences, no matter how imposing, are liable to be forgotten! Research, to be profitable, must follow its own lines; failing here, gaining a little there, succeeding greatly where least expected! Truth lies concealed at the bottom of a well and is often missed even by the best investigators. But who shall say that the time is wasted that is spent at great Conferences for the improvement of the world? There is a place for research and a place for the laying out of plans for its application.

But cities endure even though the great Conferences held in them become gradually obsolescent. Let us hope that, with its liberation from the German Herrenfolk, Cannes may awake to fresh Conferences—there could not be a more delightful place for them—and that it may again become, what it had been for so long, a charming and attractive seaside resort where men may be again as gay, as optimistic and as free as we were in the year 1919!

Clinical and Other Notes.

BLIND NASAL INTUBATION FOR ENDOTRACHEAL ANÆSTHESIA.

BY MAJOR A. W. RAFFAN, M.B., CH.B.

Royal Army Medical Corps.

IT has been reported that nasal intubation for endotracheal anæsthesia produces a higher incidence of minor respiratory sequelæ than oral [1] and for that reason some anæsthetists [2] prefer to use the oral route rather than the nasal. There are, however, some occasions when blind nasal intubation is recommended and others when it is essential.

The method is recommended in cases where there is a bleeding point in the nose, mouth or pharynx, when by rapid blind intubation under light anæsthesia the tube is introduced before the cough reflex disappears (*vide infra*) and a throat pack will then prevent blood entering the trachea. Intubation by direct vision with the laryngoscope requires complete relaxation of the muscles of the jaws which is only obtained in a deeper plane of anæsthesia. Blind intubation is also recommended in cases of fracture of the mandible or maxilla when the introduction of the laryngoscope might increase bony displacement.

The method is essential when the jaws are splinted or wired in apposition when the only alternative would be to remove the splints with the possibility of causing refracture. Blind intubation is also essential in cases of microstomia due to burns.

It is for these specialized cases that this technique is described in detail.

SOME ANATOMICAL FEATURES CONCERNING THE OPTIMUM TIME FOR INTUBATION.

The optimum time for blind intubation occurs when there is a certain amount of tenseness of the pharyngeal and tongue muscles. The muscles most concerned are (a) the *genioglossi* which run from the mandible at the symphysis menti to the tongue; some fibres are connected to the hyoid bone and others merge with (b) the *superior constrictor muscles* of the pharynx; and (c) the *geniohyoidei* running from the mandible to the hyoid bone. When these muscles are contracted, and *if the chin is held forward*, the tongue will be pulled forward, the hyoid bone upwards and forwards and the pharynx narrowed; the effect being, as described by Human, to convert the posterior pharyngeal wall into a groove the deepest portion of which is the mid-line. Along with the hyoid, the epiglottis and the larynx will be pulled upwards by the hyo-epiglottic and thyro-epiglottic ligaments and the glosso-epiglottic folds of mucous membrane connecting the epiglottis with the base of the tongue will tend to lift the epiglottis in an upward and forward direction exposing the interior of the larynx.

If, then, blind intubation is attempted when these muscles are tense, with the chin held up, the tube will find the mid-line of the posterior pharyngeal wall as it is the deepest part of a groove, provided the nostril is free with a fairly normal septum. Then the curve of the tube will tend to bring the tip forward in the mid-line in the direction of the larynx which will be exposed with the epiglottis drawn up out of the way.

This condition of tenseness of the muscles occurs during fairly light anæsthesia, during the second stage and first plane of the third stage (Guedel's Classification), with maximum between the two. During the first plane of the third stage there will also be regular forcible breathing which is a great help, for then the cords are opened widely at expiration and the epiglottis is blown up and forward exposing the laryngeal cavity. It will also be easy to hear the breath sounds, the intensity of which is a guide to the position of the tip of the tube. The cough reflex may not be absent and in fact, with the tip of tube at the laryngeal brim, it may be advantageous to stimulate a cough to facilitate intubation by opening up the vocal

cords. The swallowing and vomiting reflexes will still be present and may be stimulated by the tube itself but, as the respiration reflex traverses the same reflex arc as these two, then regular breathing alone will inhibit swallowing and vomiting. Therefore it is important to keep the patient breathing and, if there is any tendency to "hold the breath" or to spasm of the cords, the addition of carbon-dioxide to the inhaled gases will help to overcome it.

At a deeper stage of anæsthesia the pharyngeal muscles will be relaxed and the epiglottis will be lying back against the posterior pharyngeal wall, occluding the entrance to the larynx. These same conditions exist, even in light anæsthesia, in patients who have fractures of the mandible such that the central fragment, involving the origins of the genioglossi and geniohyoidei muscles, is loose.

Choice and Preparation of the Tube.—The choice of a suitable endotracheal tube requires the most careful consideration. It should be small enough in external diameter to be easily rotated in the nostril, about a size 7 Magill for an adult male. A new tube will be so inflexible that it will be apt to curve round too much in the pharynx and impinge against the anterior wall of the pharynx or larynx (*vide infra*). On the other hand a very old tube will be so soft that it may be easily obstructed or deflected. A size 7 of moderate consistency seems to be the most advantageous and if a new tube is kept in cold water for a time it will become more flexible. Before use it is essential to lubricate the distal half of the tube with vaseline or liquid paraffin to facilitate its introduction through the nose and to aid rotation if it is necessary to correct a deflection. A 10 per cent cocaine in vaseline paste is recommended if the anæsthesia is to be kept light during the operation.

Preparation of the Patient.—In addition to a sedative, an adequate dose of atropine or scopolamine is desirable before operation to diminish secretion.

Spraying of the nose with 20 per cent cocaine will produce more room in the nose from shrinkage of the turbinates [3], but the larynx should not be sprayed as the presence of laryngeal sensitivity is important as an aid to intubation and especially if there is a bleeding point into the pharynx when it is necessary to intubate while the patient is still able to cough.

Induction of Anæsthesia.—The induction of anæsthesia to the second stage, or first plane, third stage, may be performed by any of the usual methods but a nitrous oxide, oxygen, ether sequence with a rebreathing machine will produce more forcible breathing in the first plane of the third stage than an open induction with a mixture of chloroform and ether. If no rebreathing apparatus is available I would recommend induction with ethyl chloride followed by ether. Pentothal alone as an induction produces very shallow and quiet respiration and blind intubation would be a "hit or miss" procedure.

TECHNIQUE OF BLIND INTUBATION.

The patient should be flat on the back, the head in alignment with the trunk and slightly extended. The anæsthetist, at the head of the table, supports the head by the occiput with one hand, fingers outstretched to facilitate movement of the head in any direction. The tube is held in the other hand with forefinger uppermost so that one can estimate how far the tube is in without taking one's ear away from the end. The little finger is used to hold the patient's chin up when the tube is near the larynx.

The nostril chosen would normally be the larger one, if there is a difference, the importance being to have the tube freely movable in the nose.

As the tube is inserted through the nose the aim is to get the tip in the mid-line. Any deflection will be felt in the fingers and should be corrected while the tube is in the nose, and not beyond, otherwise it will only be twisted on itself without much difference in the direction of the tube.

When the tip of the tube is in the pharynx it is advanced during expiration only, and by listening closely to the breath sounds, they will gradually increase in intensity if the tube approximates the trachea. Some writers recommend advancing the tube during inspiration but I have found it much more satisfactory during expiration as one hears the breath sounds more easily, the epiglottis is blown up out of the way, and the vocal cords are less sensitive.

At this stage the head is fully extended and if the tube is not too new and inflexible it will find its way into the trachea. If the anæsthesia is very light the cords may go into spasm, recognized by a sudden cessation of respiration, and then, if one waits with the tip of the tube at the entrance to the trachea, the patient will eventually give a cough and at that moment, while the cords are open, the tube can be inserted.

Deflection of the Tube.—If the tube is deflected to one or other side it will stick on the vestibular or ary-epiglottic folds or in the sinus of larynx. To correct this, the tube can be withdrawn till the tip is in the nose and rotated and reinserted. Alternatively it may be corrected more quickly by rotation of the head while the tip is maintained in the region of the larynx.

Sticking of the Tube in the Mid-line.—If the tube appears to stick in the mid-line it must be impinging against the anterior wall of the pharynx above or below the epiglottis, a problem of the inflexible tube. By listening to the breath sounds one must now decide if the tip of the tube is impinging proximal or distal to the epiglottis. If it is distal the sounds will be maximal, or there will be a complete stoppage due to temporary spasm of the glottis and, to correct this obstruction, the head is flexed and the tube is then free to enter the trachea. On the other hand, if the tube is impinging proximal to the epiglottis, in the vallecula, the breath sounds will be decreased and in this case the tube is withdrawn slightly to evade the epiglottis, the head is flexed and the tube pushed on. The tube will now almost certainly miss the larynx and enter the œsophagus, in which case the head is then extended and as the tube is gently withdrawn the tip will suddenly become free of the œsophagus and spring forward in the region of the larynx, impinging the anterior wall *distal* to the epiglottis, when, as above, it is inserted into the trachea by flexion of the head.

First Failure.—Speed is essential in the various stages described, for the patient is only lightly anæsthetized and there may not be time to carry out the necessary corrections at the first attempt if the case is not a straightforward one. Then it will be necessary to give more anæsthetic, which may be done by withdrawing the tube completely and replacing the mask or facepiece as before or by leaving the tube *in situ* and continuing the anæsthetic as an intrapharyngeal one. This latter method is advantageous in severe wounds of the mouth and lower jaw and it will also save a little time for the next attempt at intubation. The addition of carbon dioxide now to the inhaled gases will be of great help in reproducing regular forcible breathing.

CONCLUSION.

Although the technique is described as "Blind" intubation it is essential in this procedure to visualize the position of the endotracheal tube in relation to the anatomy of the pharynx and larynx in order to make the necessary corrections in the position of the tube.

SUMMARY.

- (1) The occasions are discussed when nasal intubation is necessary.
- (2) The anatomy is described in relation to the optimum time chosen for intubation.
- (3) The choice and preparation of the tube, the preparation of the patient and the induction of anæsthesia are mentioned briefly.
- (4) The technique employed for blind intuition is discussed in detail.

REFERENCES.

- [1] GILLESPIE, N. A., and CONROY, W. A., "Anæsthesiology," 1941, January, p. 28.
- [2] HEWER, C. L. "Recent Advances in Anæsthesia and Analgesia," 1943, p. 116.
- MILNE, R. M. P., and MACKENZIE, J. R. *Brit. Med. Journ.*, 1939, December 9, p. 1,136.
- [3] HEWER, C. L. "Recent Advances in Anæsthesia and Analgesia," 1943, p. 112.

A BED-PAN SLUICE IN THE FIELD.

BY COLONEL R. I. POSTON,
Commanding — General Hospital.

ESPECIALLY with dysenteric cases it is of the greatest importance that bed-pans are properly sluiced under conditions which prevent the possible extension of infection by flies, etc.

A bed-pan sluice in the field must therefore (a) have an adequate supply of running water, (b) this water must disappear quickly, and (c) the trench or pit into which it disappears must be fly proof.

With these points in mind a sluice was evolved and put into actual practice with good results. The construction is briefly as follows :—

- (1) A pit 2 feet broad by 6 to 10 feet deep is required.
- (2) This pit should be revetted.
- (3) Pre-cast concrete tops, conical in shape and with a central hole, are then fitted over the pit. The hole is fitted with a pipe at the bottom of which is a baffle plate, actuated by a lead counter balance (as in sketch opposite).
- (4) Over each sluice is erected a stand-pipe. A spring tap is preferable as this controls the amount of water used and prevents the pit from becoming full too quickly when there is bad soakage.

I am indebted to Major Stower, R.E., for his help in evolving this structure and to Colonel C. H. K. Smith for permission to forward this article.

TWO CASES OF TIETZE'S DISEASE.

BY CAPTAIN B. S. S. ACHARYA,
Royal Army Medical Corps.

It was decided to report these two cases because of their rarity. Since Tietze [1] described the condition in 1921 only 21 cases have been recorded. The following two cases showed the typical syndrome of non-suppurative, non-specific swellings affecting rib cartilages.

CASE REPORTS.

Case 1.—Male, aged 28. Developed sore throat with impetigo of face and six weeks later complained of painful swelling at the second left costo-chondral junction, pain worse on deep breathing. He also had a slight cough. There was no history of injury or loss of weight. No history of T.B. in the family.

On Examination.—Temperature normal. Throat clear. There was no sign of lung infection. There was a visible swelling at the second left costo-chondral junction, firm elastic consistency, oval in shape, tender, upper and lower limits ill-defined and the overlying skin was normal.

Other Systems.—Nothing abnormal found.

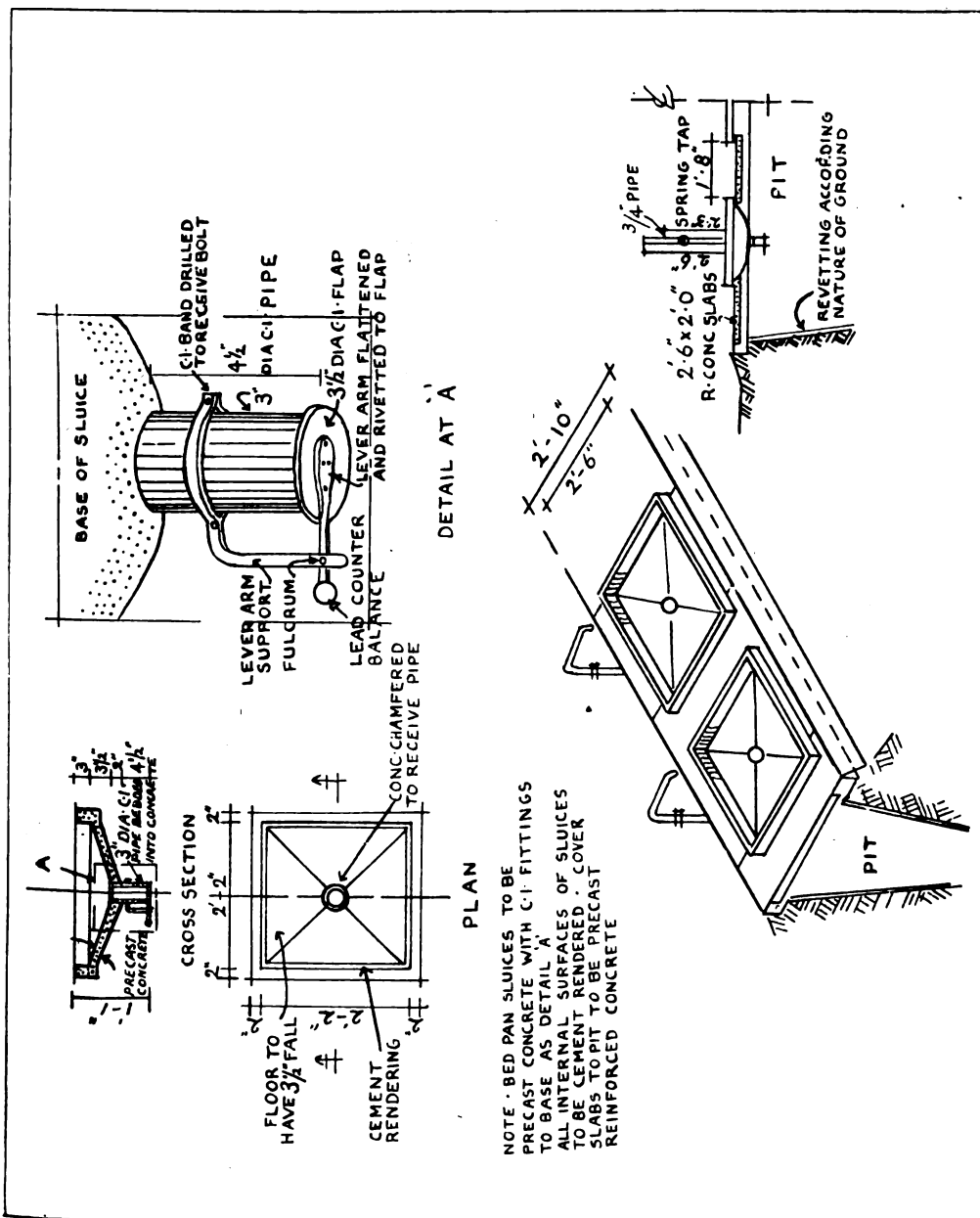
Radiographs.—Showed no abnormality.

Investigations.—Blood count, urine examination, B.S.R. and blood Kahn negative. No material could be obtained on needling.

Progress.—The lump is still tender after six weeks and size unaltered.

Case 2.—Male, aged 22. Three weeks before admission, on gripping a wheel, felt pain at the second right costo-chondral junction and noticed a lump. He complained of a slight cough and there was no history of loss of weight. This man did not give any history of injury either.

On Examination.—Tender swelling in every way similar to the case described above except that the lump was situated on the right side at the second costo-chondral junction. This man has signs of bronchopneumonia. As in the above case all investigations were negative.



COMMENT.

Five cases recorded by Arden Jones and Leo Pollak [2] showed respiratory tract infection associated with the swelling. In the above two cases, the second case had signs of bronchopneumonia but the first case had no signs of respiratory tract infection at the time of admission. The first case had 21 grams of sulphanilamide for his impetigo but it made no difference to the size of the swelling.

Thanks are due to Major R. V. Facey, R.A.M.C., and Major W. M. Forster, R.A.M.C., for pathological and radiological examinations.

REFERENCES.

- [1] TIETZE, A. (1921). *Berl. Klin. Wschr.*, **58**, 829.
 [2] JONES, A., and POLLAK, LEO (1942). *B.M.J.*, **2**, 155.

A CASE OF PYONEPHROSIS IN A PELVIC KIDNEY.

BY CAPTAIN G. ST. J. HALLETT,

Royal Army Medical Corps.

THE patient, a P.O.W., aged 32, was admitted to — General Hospital from a P.O.W. Hospital on March 9, 1943.

Past History.—August, 1941, developed pains in the left side of the abdomen and burning pain on micturition. This cleared up but recurred in March, 1942, when he was admitted to the Security Hospital. His urine contained: Albumin + +. Pus Cells + + -. Gonococci + +. No T.B. seen. Culture—no T.B. grown.

He was treated with permanganate bladder wash-outs, citrates, and sulphonamide but the urine remained the same.

On admission to General Hospital his general condition was fair. T. 98.4°. Tongue furred. Abdomen tender on left side. Kidneys not felt. P.R., N.A.D.

Urine: Acid. Albumin + + +. Pus Cells + + +. R.B.C.s + +. Short chain streptococci. No G.C. No T.B. seen.

Blood Urea: 44 mgms. per cent.

Chest X-ray: Lungs normal.

Intravenous pyelogram: Right kidney-concentrates well; normal form and position. Left kidney no concentration. No calculi seen. Cystoscopy—generalized cystitis, mucosa congested. Right ureteric orifice normal. Right ureter catheterized and clear urine obtained. Thick pus in region of left ureteric orifice. A thread of pus appeared to be issuing from the left ureter but the catheter persistently buckled and could not be introduced more than a few millimetres. A diagnosis of left pyonephrosis was made and, although a retrograde pyelogram had not been possible, it was decided to operate.

Operation.—April 3, 1943, under G. and O. and E.; via a left lumbar incision. A search failed to reveal any signs of a kidney above the level of the pelvic brim. The wound was closed without drainage.

It was assumed that the man had a congenitally non-ascended kidney which was lying infected in the pelvis.

He made a good recovery from the operation but two further attempts at retrograde pyelography met with the same result as the first. The man's condition slowly deteriorated and in July he complained of more pain in the pelvis and bouts of pyrexia were more frequent. A tender mass was palpable on the left side above the pelvic brim. P.R.—N.A.D. It was decided that a further attempt to locate and drain the kidney was necessary.

Operation.—August 10, 1943, under G. and O. and E.; preceded by transfusion of 1 pint of blood. Lower left paramedian incision, peritoneal. Peritoneum reflected to pelvic wall. The peritoneum stripped easily until a tense fluctuant mass the size of an orange was encountered in the left side of the pelvis. The peritoneum was densely adherent to the front of this. The mass was first aspirated and then incised and some 8 ounces of thick muco-pus evacuated.

The condition was evidently a thin-walled pyonephrosis and a piece of the wall was removed for microscopy. The patient's condition was poor and nothing more radical than drainage was considered justifiable. A large drainage tube was introduced into the kidney retro-peritoneally *via* a counter-incision in the iliac fossa. The para-median incision was closed with a small tube in the cave of Retzius. He was given a pint of blood and 9 pints of intravenous saline in the course of the next forty-eight hours and has made a good recovery.

If his general condition improves and a fistula persists, it may be possible to undertake a subcapsular nephrectomy at a later date.

AN ENTERIC-LIKE INFECTION DUE TO *B. FÆCALIS ALKALIGENES*.

BY MAJOR C. RAEBURN,

Royal Army Medical Corps.

B. Fæcalis alkaligenes is an organism commonly found in human fæces and has in the past been held responsible for infections of enteric type. (Petruschky [1] (1896), Hirst [2] (1917), Khaled [3] (1932)). In 1935 Nyberg [4], doubting whether there was such a bacterial entity, carefully analysed a large number of strains and gave data for two main groups, the first a bacillus and the second a vibrio. The bacillus possessed flagellæ but was either feebly motile or non-motile. It gave no fermentation reactions, produced no indol and did not alter milk. The vibrio was actively motile and slightly alkalized dextrose media. This advance in classification unfortunately provided no clue as to which, if either, of these organisms was responsible for the infections recorded in the literature. The textbook description is still that of a bacillus fermenting no sugar and alkalizing litmus milk—an organism of doubtful pathogenicity.

This paper describes three cases occurring in Egypt which are adequately proved to be due to an organism very like Nyberg's *Bacterium alkaligenes*.

CLINICAL ASPECT.

Case 1.—An R.A.M.C. Officer. He complained one morning of intense headache, nausea and general malaise. The symptoms and previous experience of my colleague suggested alcoholic sequellæ but as his temperature was 99.2° F. he was admitted. The prominent symptoms were the very severe headache, not relieved by salicylates, marked anorexia and a remarkably furred tongue resembling chamois leather in appearance. There were no physical signs. By the third day of the illness the temperature had risen slightly and remained near 100° F. The headache improved but general malaise persisted. The general appearance suggested a mild typhoid fever. The white cell count on the third day was 6,400, polymorphs 68 per cent, lymphocytes 30 per cent, urine no abnormality, fæces a high proportion of *B. fæcalis alkaligenes*. Blood culture on the third day yielded *B. fæcalis alkaligenes*. This was considered to be a contaminant but a repeat on the sixth day was also positive. The patient's serum was tested against this organism and agglutinated it to 1 : 25. Although the Widal reaction has practically been abandoned it was tried as a matter of interest and was negative. The spleen was just palpable on the sixth day. The temperature was normal on the seventh day and recovery uneventful.

Case 2.—A British private. This case was also characterized by a fairly sudden onset of headache, furred tongue, malaise and mild pyrexia. It was of longer duration, fifteen days, and no physical signs developed. White cell count fifth day 7,600. Normal differential. Blood culture seventh day, *B. fæcalis alkaligenes*. Blood culture tenth day, *B. fæcalis alkaligenes*. Widal tenth day negative.

Urine negative. Fæces, a high proportion of the same organism. Agglutination of the organism by the patient's serum to 1 : 10 only.

Case 3.—A Sister. The onset was more insidious but still characterized by headache and a "wash leather" tongue. The temperature rose gradually to 103° F. and declined slowly, the duration of pyrexia being twenty-two days. The spleen was just palpable.

Investigations :—**Blood counts.**

4th day : 19,200. Polymorphs, 76 per cent ; lymphocytes, 18 per cent.
 8th day : 12,800. Polymorphs, 60 per cent ; lymphocytes, 30 per cent.
 12th day : 14,400. Polymorphs, 64 per cent ; lymphocytes, 32 per cent.
 20th day : 6,900. Polymorphs, 56 per cent ; lymphocytes, 40 per cent.

Blood cultures were taken on eighth, twelfth, eighteenth days. All three yielded *B. fæcalis alkaligenes*. A further culture taken after the end of the pyrexia was sterile.

Agglutination of the organism by the patient's serum 1 : 25 partially. Widal, negative.

The Organism Isolated.—A Gram-negative bacillus. Motile but not very active. The available sugars—glucose, maltose, lactose, sucrose and mannite, were not fermented. Indol was not produced but litmus milk became slightly alkaline. In the last particular alone does it differ from Nyberg's *Bact. alkaligenes*. The colonies conformed to the usual type and need no description.

Diagnosis.—Blood culture is the one investigation of value and for an organism of this type isolation must be achieved at least twice. Several cases of this type have been rejected on account of a single isolation.

The examination of urine and fæces is of no value. It may be worth noting that I have found a persistent *Bact. alkaligenes* bacilluria on several occasions amongst the Egyptian Fellahin.

Agglutination tests are valueless. It is the exception for human serum not to agglutinate this organism. The titre may reach several thousands. The three cases described were singularly devoid of serum agglutinins—possibly an important point.

SUMMARY.

Three cases of continued fever are described which clinically belong to the enteric type and bacteriologically are shown to be due to an organism closely resembling and probably identical with Nyberg's *Bact. alkaligenes*.

REFERENCES.

- [1] PETRUSCHKY, J. (1896). *Zbl. Bakt.*, **19**, 187.
- [2] HIRST, L. F. (1917). *J. R. Army Med. Cps.*, **29**, 476.
- [3] KHALED, Z. (1923). *J. Hyg. Camb.*, **21**, 362.
- [4] NYBERG, C. (1935). *Zbl. Bakt.*, **133**, 443.

APPARATUS FOR MAKING PLASTER OF PARIS BANDAGES.

BY SERJEANT A. LEVEY,

Royal Army Medical Corps.

THE following apparatus has been designed to save valuable time in the making of plaster of Paris bandages. With the use of this simple device, 100 to 120 bandages, correctly made and rolled, can be produced, as compared with 15 to 20 made by hand, in each hour.

Materials required :—

- (1) Biscuit tin minus lid 9 inches by 8½ inches.
- (2) Two pieces of wood 8½ inches by 15 inches by ¼ inch.
- (3) Two pieces of wood 10 inches by ½ inch by ½ inch.
- (4) Six 1 inch nails.
- (5) Two pieces of strong thin wire 10 inches in length.

Tools required :—

Hammer, saw, jack knife.

N.B.—If biscuit tin is not available wood should be cut in ratio to size of tin available.

Assembling of Apparatus :—

- (1) Cut rear out of tin.
- (2) Cut front base of tin 7 inches by $1\frac{1}{2}$ inch.

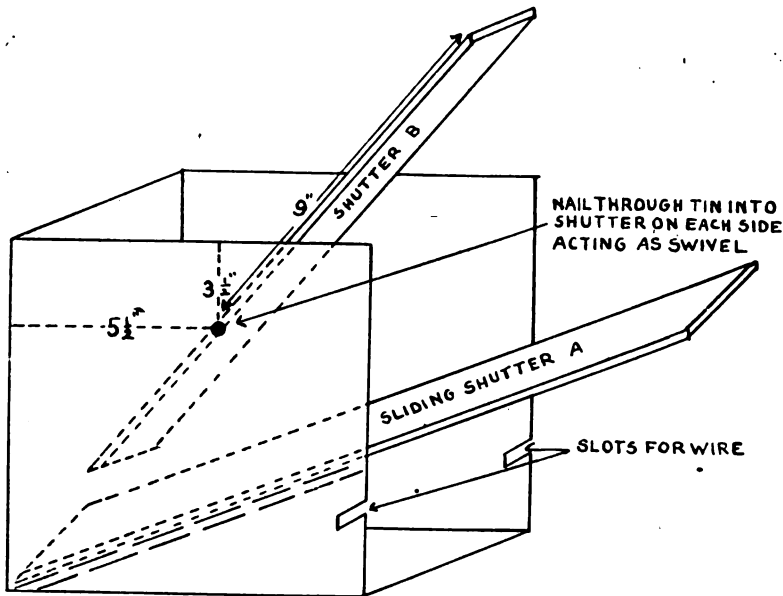


FIG. 1.

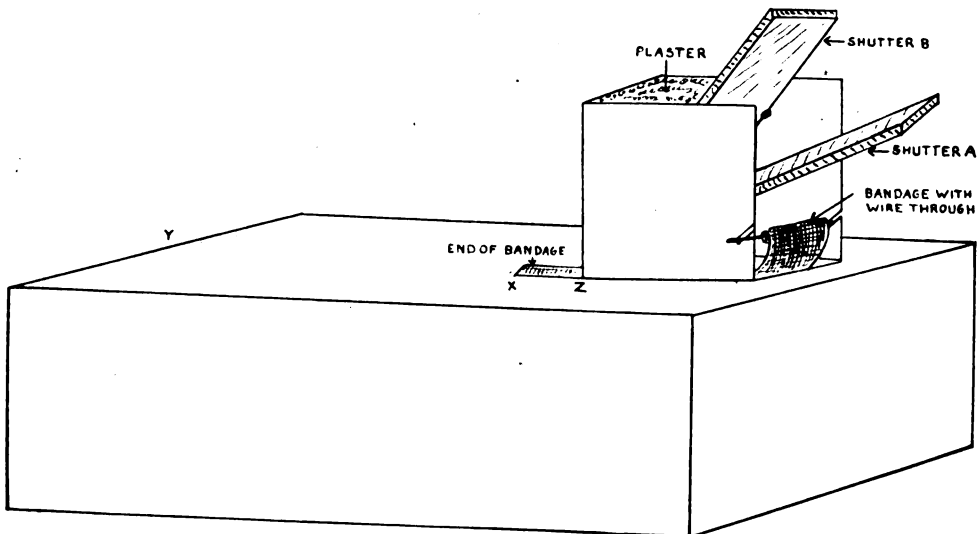


FIG. 2.—Illustration of apparatus on table showing position end of bandage X to be pulled through tin to edge of table Y and allowing it to roll back to tin edge Z.

(3) Two slots to be cut in rear of tin. The tin can be cut quite easily with jack knife and hammer.

(4) Runners for shutter "A." The two pieces of wood 10 inches by $\frac{1}{2}$ inch by $\frac{1}{2}$ inch to be nailed on the interior of the sides of the tin and made to fit flush with base and sides.

(5) One piece of wood $8\frac{1}{2}$ inches by 15 inches by $\frac{1}{4}$ inch acts as Shutter "A".

(6) The second piece of wood, $8\frac{1}{2}$ inches by 15 inches by $\frac{1}{4}$ inch, is nailed to the inside of the tin (fig. 1) and acts as a swivel to control feed of plaster (Shutter "B").

Biscuit tin should have bevelled rims removed, if any, and all rough edges smoothed by turning outwards.

How to use the Apparatus :—

(1) Place the tin on table in position shown in fig. 2. Close Shutter "A" and fill the front with plaster of Paris powder.

(2) Thread the muslin bandage through the centre with a piece of wire 10 inches long and place in slot provided at rear of tin.

(3) Thread end of bandage through opening in front of base of the tin, open Shutter "A," and the apparatus is ready.

The apparatus can be worked by one man but further time is saved if two are employed.

No. 1 man stands in front of table facing apparatus.

No. 2 stands at the rear.

No. 1 pulls loose end of bandage towards him to end of table and allows the bandage to roll backwards on itself. If the table is slightly elevated at the front, the bandage will roll of its own accord. When it reaches the tin it is then firmly gripped with the thumb and forefinger and pulled towards him. This is done till the bandage is complete. This method ensures a perfect loosely rolled bandage. Shutter "A" is then closed.

No. 2 prepares the next bandage ready to place in slot.

No. 2 maintains plaster level in tin which should always be kept full as it is the weight of the plaster which impregnates the muslin and dispenses with the former method of rubbing with the hand.

He also regulates Shutters "A" and "B."

Reviews.

FORWARD SURGERY IN MODERN WAR. By Major-General W. H. Ogilvie, M.A., M.D., M.Ch., F.R.C.S. London: Butterworth & Co., Ltd. Pp. 90. Price 10s. 6d. 5s. 6d., post free, to doctors serving with H.M. Forces.

The book under review represents the first attempt during this war by a single author to give a composite picture of the whole of field surgery. It is true that the scope is a limited one and that the experience and teaching of specialists have been duly sifted and incorporated. The result is a compact well written volume of some ninety pages which gives a coherent picture of the various problems involved and much sound practical advice. For the young surgeon in the field a publication of this kind presenting a definitely personal view will have great value; he will no doubt also study compilations and individual memoranda.

General Ogilvie first outlines the organization and function of F.A., F.D.S. and C.C.S. The necessity for flexibility in the use of these units is made clear. He gives his own ideas on the sorting and grouping of casualties for the purposes of evacuation and surgical treatment. A short chapter on wound treatment exposes views which are generally accepted, except that he advises the administration of A.T.S. to a limited group only. He is not favourably inclined to the local use of sulphanilamide and calls attention to the dangers associated with the less soluble drugs, sulphathiazole, sulphapyridine and sulphadiazine.

He is doubtful of the value of penicillin in the forward zone.

From his chapter on shock one may quote the following dictum in order to show its practical attitude, "It is important to recognize shock, but equally important not to start shock treatment blindly on those who are merely cold and tired." The possibility that blood transfusions may be sometimes responsible for deaths is not ventilated.

The attempt to classify shock accurately on an ætiologic basis is considered of small value in the field and he admits the use of the terms primary and secondary shock as useful under these circumstances.

Observations on the use of heat and warning against its routine use are sound for those working in a hot climate but it may be hoped that the method will not be so far discredited as to lead to the disuse of this aid in cold climates.

There is a useful chapter on the surgeon's work in a F.S.U. The nature, the indications for and the limitations of prophylactic wound excision and debridement are admirably stated.

From his summary of this section the following sentence is worth quoting. "He finds it hard to realize that in an operational area he is no longer the arbiter of his patient's fate but merely responsible for one step in a line of treatment of whose preceding steps he is ignorant and over whose subsequent steps he has no control."

In chapter five standard methods for immobilizing the extremities are clearly described though it must be said that the figures illustrating this section are not attractive.

The management of external bleeding and arterial hæmatoma in the forward area will always present difficult problems. The solutions offered by the author will meet with general acceptance. How far it is sound to advocate injection of the stellate and lumbar ganglion in the field after main vessel ligation is perhaps a matter of opinion.

The chapter on abdominal wounds is excellent and full of useful advice to the surgeon faced with the problems of perforated gut in forward areas.

The chapters on head and chest injuries do not deviate in their views from those generally current. Burns are given some consideration; the author agrees that coagulants have no place in field surgery and favours a simple paraffin dressing. Due emphasis is given to the treatment of shock for these conditions and meticulous surgical cleaning of the burnt surface is condemned.

The volume terminates with a neat essay on surgery at the Base in which will be found a crisp assessment of the closed plaster technique.

The book is well printed and bound according to current standards and is moderately priced.

C. M. P.

SURGERY OF MODERN WARFARE. Third Edition, Parts IV and V. Edited by Hamilton Bailey, F.R.C.S. Edinburgh: E. & S. Livingstone. 1944. Part IV, Pp. 507-716. Part V, Pp. 717-896. Price 15s. each part.

Part IV comprises—Wounds of bones and joints, wounds of the hand and foot, wounds of tendons and peripheral nerve injuries, wounds and injuries of the spine and wounds of the head and neck.

These volumes are of a very handy size to read and hold; the illustrations are profuse and the whole get-up is excellent.

As might be expected, the subject-matter has more to do with treatment in base hospitals and not so much with surgery in the Field.

The sections on peripheral nerve injuries and wounds and injuries of the spine are particularly good and there is a most useful chapter by Ogier Ward and Riches on the management of the bladder in spinal injuries.

Part V comprises—Wounds of the head and neck (continued), otorhinolaryngology in relation to war injuries, wounds of the eye and orbit and wounds of the trunk.

The section on injuries of the brain and skull (Dott, Alexander and Ascroft) is particularly helpful and practical and that on wounds of the thorax (Tudor Edwards and Barrett) is excellent.

The last chapters, on abdominal surgery, by Sir John Fraser and R. Charles are most practical and full of sound advice.

These two volumes certainly keep up the promise of the earlier parts to present an up-to-date and authoritative account of the treatment of wounds in war.

TEXTBOOK OF MEDICAL TREATMENT. Third Edition. Edited by D. M. Dunlop, L. S. P. Davidson, and J. W. McNee. Edinburgh : E. & S. Livingstone Ltd. 1944. Pp. XXIV + 1218. Price 30s. net.

Not a long time elapsed after the first appearance of this combined work of authors from Scottish schools in 1939 before it came to be recognized as one of the standard British textbooks on the subject of medical treatment. The broad, balanced and rational approach of most of the subjects is exemplary and the space taken up by general considerations is thoroughly justified. In order to bring the work up to date nearly all the sections have been amended, some being re-written, and included in the new material is an admirable section dealing solely with the clinical use of the sulphonamide drugs. In the next edition we shall expect to find an account of the properties of penicillin ; the reader will search in vain for a mention of it in this one. Presumably the editors are waiting until the drug has in every way passed the experimental stage, although we find that thiouracil (unfortunately misspelt in the text), which is still under clinical trial, is allotted a short paragraph. In recommending this third edition as a textbook of great practical value to all students and practitioners of medicine it should be sufficient to say that the authors have fully maintained their previously high standards.

W. H. H.

DISEASES OF THE NOSE, THROAT AND EAR. Third Edition. By I. Simson Hall, M.B., Ch.B., F.R.C.P. Edinburgh : E. & S. Livingstone. 1944. Pp. XII + 459. Price 15s.

This is the third edition in seven years of a book intended for students and practitioners, a useful small volume, of which criticism must be limited to detail.

Fracture of the nasal bones is best corrected well before three weeks have elapsed ; elevation is often not possible until disimpaction has been achieved and ethyl chloride is frequently an inadequate anæsthetic. Established sinus infection is not usually considered a bar to operation on the nasal septum, more particularly if deviation is impairing sinus drainage. The author makes no mention of the innocuity of many deviations of the septum.

A valuable caution is given as to the diagnosis and treatment of sinus affections in allergic subjects but the indications given for the removal of tonsils and of adenoids are wider than would meet with general acceptance.

A full description is given of the technique of the obliterating frontal sinus and ethmoid operation and of the radical mastoid operation as being procedures which the inexperienced surgeon may have to perform urgently. Neither operation is ever a surgical emergency ; acute conditions are more safely dealt with by less extensive and less exacting procedures.

A few minor anatomical errors have escaped correction but the book is easily read, has been excellently produced, and well fulfils its purpose.

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MARCH FRACTURE: A SERIES OF 64 CASES.

BY MAJOR P. R. WILSON, M.A., M.R.C.S.,

*Royal Army Medical Corps,
Physical Medicine Specialist.*

I.—INTRODUCTION.

IN this present World War the syndrome known as March Fracture has once again become much in evidence. It first gained prominence during the Great War of 1914-1918 but the condition had been discussed by several authors during the latter half of the 19th century and Breithaupt [1], a Prussian Military Surgeon, described it as early as 1855.

Most authors have confined their studies to a relatively small number of cases, and it is hoped that, by analysing some 64 cases, further light may be thrown on the ætiology, treatment and prevention of the condition.

The present series all occurred in young soldiers undergoing a course at an Army Physical Development Centre. It would be well at first to describe briefly the object of such a Centre and the type of training undertaken.

The object of a Physical Development Centre is to raise the fighting efficiency of the Army by specialized training of men who are under 30 years of age and, where possible, to raise their medical categories. The trainees fall into two main groups. First, newly joined recruits from Primary Training Units, mostly under 20, who, whilst properly placed in Category A1, are not "fighting fit" and are likely to break down if submitted to the full rigors of Basic Military Training.

These lads are mostly under-developed and under-nourished with here and there some minor remediable disability. The second group comprises men from Field Force Units, who are of a lower medical category on account of some such disability, are of poor physique, or men who have broken down as a result of training. This latter group consists very largely of foot defects.

Each course at the Centre lasts about two months. The essence of the work comprises graduated physical development. Most of the disabilities encountered are the results of muscular imbalance. The training, therefore, largely consists of progressive physical training with Remedial Training in selected cases. In addition, road work, running, obstacle training and activities of a military nature and graduated route marches complete the physical pro

gramme. The route marches take place once a week, starting in the first week with 3 or 5 miles, working up by small weekly increments to 18 miles in the last week but one, and, in the final week, a 15 mile march on each of two consecutive days. For the first few weeks the trainee carries no pack or rifle but these are added to his load in the second month of training.

Men with foot disabilities are grouped separately and their route marching and other road work progression is slower than that for men of poor physique. This latter type is grouped according to body weight for all physical activity.

II.—OBSERVATIONS.

Only 4 of the 64 cases were originally placed in Foot Disability Groups—3 being Flat Foot and one Hallux Rigidus—the remaining 60 all being grouped as Under-developed or Poor Physique.

Table I shows the distribution of these cases according to their medical category, and Table II the average of age, height and weight.

TABLE I.				
Category	A1	A2	A3	B1
Numbers	32	5	1	26

TABLE II.		
Average age	Height	Weight
18 years 11 months	5 feet 6 inches	116 lb.

Only 10 of the 64 cases came from units other than Primary Training Units and, of these 10, 1 had four years' service, 1 two and a half years and the remainder under one year. Of the 54 men from Primary Training Units none had had more than three weeks' service before arrival at the Centre.

The civilian occupation in each case can be classed as sedentary or semi-active. In no case was a man previously employed at a job involving any marked degree of physical activity, in particular involving the continued use of the legs in standing or walking, and none of the men had any previous athletic record of note.

The incidence of fracture involved either foot in about equal proportions but by far the most frequently injured bone was either the 2nd or 3rd metatarsal. Table III sets out the bones fractured.

TABLE III.					
Metatarsal	II	III	IV	V	Total
	
	
	
	
Total	62				

In addition, one man fractured the 2nd metatarsal of both the left and right foot, and another man fractured both the 4th and 5th right metatarsals.

HISTORY.

Unfortunately no accurate records were kept of the first 15 cases so that various data are not available.

The classical and typical history is given in 72 per cent of cases. A young under-developed soldier, in the middle of his course, sets out on a route march of 15 or 18 miles wearing field service marching order and carrying a rifle. After some 10 miles he feels an ache in the fore-foot, which gradually increases in severity and becomes strictly localized, the pain being accentuated each time the affected foot is put to the ground. In nearly every case the total march was completed.

Of the 64 cases, 46 (or 72 per cent) occurred during a route march, 34 of these being of

either 15 or 18 miles. Nine cases occurred during a 12-mile march and 3 during a 9-mile march.

In 9 cases a history of some trauma other than marching was obtained. Thus, 4 gave a history of pain suddenly coming on while jumping the obstacle course, 3 while jumping in the gymnasium, one while running a mile test in gym shoes and one stepping on a pebble in gym shoes. Two men sustained their injury before arrival at the Centre but had not been diagnosed before they were first seen at the Centre. In seven cases there are no available records of the history.

The majority of these fractures occurred in the middle of the course, 44 of the 64 occurring between the fourth and seventh weeks of training. This period corresponds to a general increase of activity in all training, including tests and, from the fifth week onwards, rifles are carried on all marches.

Physical Examination.

(1) *General.*—The general physique of all trainees was broadly classified under the headings "Good," "Fair," or "Poor." Of the 64 cases of march fracture, 44 had physique classified as "Poor," 17 as "Fair," and only 3 as "Good." Similarly with general posture, 33 were "Poor," 26 "Fair," and 5 "Good." Thus over 90 per cent can be classified as being of poor or fair physique and posture. The main postural defects were Sway Back, Forward Slump, minor Kypho-Scoliosis, Flat Chest and general poor muscle tone. Fourteen (or 22 per cent) showed definite knock-knees of more than two inches separation of the internal malleoli but only one case had any marked degree of bow-leg.

(2) *Feet.*—As has already been stated only 4 cases (6·2 per cent) had foot defects which warranted their being placed in Foot Disability Groups at the beginning of the course. Of the remaining 60 cases, 72 per cent had some minor foot defects not considered to require special attention but recorded on the original medical case sheet. These defects were mostly a low longitudinal arch which was readily restored, a spreading of the metatarsals and a dropping of the transverse arch. In only 5 cases was any defect of foot mobility found. From this it would be fair to state that the majority of these feet showed evidence of poor muscle tone which can well be considered as part of the general poor muscle tone of the rest of the body.

(3) *Local.*—The physical signs in practically every case are typical. The man presents a foot which shows a small localized swelling on the dorsal aspect, usually over the 2nd or 3rd metatarsal near its distal end. There is slight pain on attempting to stand on tip-toe. The swelling is rubbery in consistency, is tender, but does not pit on pressure. The point of maximum tenderness is usually clearly defined and points to the site of the fracture. On the plantar aspect there is no abnormality to be seen and tenderness is not marked to any extent but passive flexion of the proximal phalanx on the affected metatarsal is usually painful.

In fractures resulting from trauma other than marching the local physical signs are usually more marked. The swelling is greater and may be red and feel hot and there may be slight pitting œdema. The tenderness in these cases is also more exquisite.

Radiological Findings.

(1) *Of the Lesion.*—X-rays were taken as soon as possible after the man was first seen. In 34 cases (53 per cent) a definite fracture was visible at this early stage, corresponding in position with the clinical signs. It is, in most cases, difficult to make out a fracture line but, on careful scrutiny of the plate, a crack can be determined. In many cases this has the appearance of a chip or flake fracture, involving only one side of the metatarsal shaft, more frequently the medial side. In a few cases a definite hair-line crack extending right across the shaft of the bone is seen. In no case was there any marked displacement. The commonest site of the fracture is the middle or the distal half of the metatarsal shaft.

In 26 cases the earliest radiological sign was a periostitis, usually seen on the medial aspect of the shaft in the form of a linear streak or narrow fluffy irregularity, with no break visible in the continuity of the bone.

In only 4 cases was no abnormality detected in the first X-ray taken.

X-ray examination, in the majority of cases, was again made after two weeks. The picture at this stage is nearly always definite. There is considerable periosteal reaction at the site of the lesion, having a cotton-wool appearance, and in the majority of cases interruption of the bone is clearly seen. There is usually more callus formation on the medial and dorsal aspects of the shaft. In a few cases there appeared to be a tendency to osteoporosis of the distal fragment noticeable at this stage in comparison with the first X-ray picture.

In many cases a third X-ray was taken after a further two or three weeks, that is five or six weeks after the injury. At this stage the healing is well established, the fracture line is filled with callus and the surrounding callus is organizing into a more dense, regular, spindle-shaped mass. Characteristically no displacement is seen, the fracture clearly uniting in excellent position.

The final X-ray picture, obtained with the follow-up report some six months after the injury, shows the restoration of the normal architecture of the bone. A slight thickening of the cortex is seen but no evidence of a fracture line.

(2) *Of the Foot.*—Unfortunately, control X-rays of the feet were not made. Opinions still vary very much as to what are the radiological appearances of the normal foot. The general impression of this series of feet can be summarized as follows :—

(a) General appearance suggests a broad fore-foot with a spreading of the metatarsals.

(b) The first metatarsal tends to be short—in no case was the 1st metatarsal equal in length to, or longer than, the 2nd and in all cases the 1st metatarsal segment showed the appearance of hypermobility.

(c) In many cases the 1st metatarsal showed a greater degree of abduction than would be expected in the so-called "normal" foot.

(d) If an imaginary line be drawn from the sesamoids to the articular surface of the head of the 5th metatarsal, in the majority of cases the heads of the 2nd, 3rd and 4th would lie wholly distal to this line and, in no case, would they be proximal to, or on a level with, this line.

Lateral radiographs are of no use in diagnosis but an oblique view in many cases showed the first evidence of fracture which was not visible in the antero-posterior view.

Diagnosis.—Provided the possibility of a march fracture be kept in mind the diagnosis presents no difficulty. The history, together with the physical signs, should provide adequate information and radiology will in nearly all cases (93.5 per cent) confirm.

III.—INVESTIGATIONS.

Treatment.—The 64 cases are divided into two series. Series A : Hospitalization, 15 cases ; Series B : Retained at the Centre, 49 cases.

Series A.—These comprise the first 15 cases. Ten were sent to a Military Hospital or E.M.S. Hospital dealing with fractures when the diagnosis had been established. Each case was eventually placed on the "Y" list and no hospital notes are available.

Five cases lack adequate records and it is impossible to state what treatment they received, how long they were off duty or their ultimate disposal.

Series B.—It became clear that a great deal of training time was being lost by cases of march fracture as those sent to hospitals were immobilized in plaster for some six weeks, then transferred to Convalescent Homes and, eventually, to Convalescent Depots and, up to this point, could do no training of any kind. It was, therefore, hoped that by instituting ambulatory treatment at the Centre it would be possible to get a man back to training quickly and prevent his general physical condition from deteriorating. Forty-nine cases were, therefore, retained at the Centre. One case received no treatment as he never complained and the condition was only found during the course of a routine examination when the fracture was already five weeks old and X-ray showed it to be healing well although there was very slight displacement. This man had remained on full training all the time and had never had any pain. Forty-eight cases received the routine treatment detailed below :—

On first reporting sick the man is given "Attend C," that is, excused all duties; he is told to wear his Army boots all the time and is sent for X-ray. The next day he is seen again, with the X-ray available, when the diagnosis is finally established. An adhesive felt pad, 5/16 inch in thickness, is cut, shaped and bevelled and applied to the sole of the foot. The distal edge lies immediately proximal to the metatarsal head, the width of the pad being roughly 2 inches distally, tapering in a pear-shaped manner and being about 3 inches in length. Minor modifications to this plan are made depending on local conditions. The pad is kept firmly in place by six or eight strips of adhesive tape placed over-lapping from below up and the ends of each strip over-lapping each other by about 1 inch dorsally. The pad is thus completely encased by the strips. The man is told to wear his Army boots all the time, and is given "Attend B" (light duties, mostly of a domestic nature) for a period varying from three days to two weeks with an average of seven days.

The patient is free of pain when thus strapped and wearing boots but he still gets pain if he wears gym shoes.

Each case is seen every two or three days while on light duties, minor adjustments to the pad and strapping being made if necessary, and the whole pad and strapping are replaced about once a week.

After this short period of light duties the patient is put back to a modified full training or what is termed "Full training—Upper Body work only." This means that he rejoins his section for all training as far as possible but does no road work, running, jumping or obstacle course training. He continues to wear his boots on all occasions and to have the foot padded and strapped. The length of time he is kept on Upper Body work varies and depends on how the lesion progresses, the average time being nineteen days.

At the end of this stage he is free from all pain and can get about on his feet perfectly comfortably and without the pad or strapping. He then resumes completely full training, wearing the appropriate footwear, but is excused obstacle course training for a further week.

Nearly every case was retained for an additional two or four weeks training to make up for lost time but, more important, to ensure that the standard of training he goes back to is not too advanced. This particularly applies to route marching.

The average total time spent from receipt of the injury to the resumption of full training, for the 48 cases that have had this treatment and since left the Centre, is twenty-seven and a half days. The longest time was only forty-two days. There were no relapses in any of these cases.

Results and Prognosis.

(1) *Immediate.*—On resuming full training the foot function has been normal in all cases and the trainee has completed the final two weeks training, which includes tests and route marches, entirely satisfactorily. No case has shown any tendency to develop a flat foot or other abnormality. In addition, great benefit has been obtained to the general physique and muscle tone by the continued upper body activity. It is thus seen that, while the affected foot is reasonably rested, as much as possible of the rest of the body is kept "in training."

(2) *Remote.*—A follow-up system has been put into use. A pro-forma (see Appendix) is sent out to the man's C.O. approximately six months after the injury. At present 28 have been sent out and 20 have been completed and returned.

Eleven of these refer to the 15 cases in Series A. Seven are entirely satisfactory. One man still gets pain when in gym shoes but is quite comfortable in Army boots. Three men complain of aching feet on jumping, or marching more than seven miles, but one of these had sustained another march fracture but not of the same metatarsal. One man was declared a Deserter so details were not available. Nine follow-up reports refer to Series B. Seven of these were entirely satisfactory, including one man who was up-graded from A2 to A1 two months after leaving the Centre. One man complained of slight aching in the foot after very strenuous exercise on a forty-eight hour scheme and one had aching after a 20-mile march, this being the man who had sustained a fracture of both his 3rd and 4th metatarsals.

IV.—DISCUSSION.

(A) *Ætiology*.—The ætiology of march fracture is a subject that has received much consideration. The majority of authors stress the fact that the condition is seen particularly in soldiers undergoing training and, usually, in the recruit. The series of cases under discussion occurred in recruits who were substandard, undergoing a special carefully graded course of training. No figures are available for the incidence of march fracture occurring in other Recruit Training Centres where the men are of average or good physique.

That the ætiology is obscure is well demonstrated by reference to the literature. Pauzat (1887) [2] suggested that a periosteal proliferation around the metatarsal shaft was produced by trauma from repeated bruising of the foot by the hard dorsal fold of the soldier's boot. Mark Jansen (1926) [3] emphasized that the periosteal thickening is related to the insertion of the interosseous muscles, being most marked on the inner borders of the 3rd, 4th, and 5th metatarsals from which both plantar and dorsal interossei originate. This is borne out to some extent in the present writer's series by the earliest radiological findings. That a muscle poor in tone is liable to produce spasm when subjected to severe strain is readily understood. Thus vascular obstruction may be produced in the periosteum, leading to decalcification, rendering the bone liable to fracture.

Morton (1927, 1928, 1930 and 1935) [4] and Dodd (1933) [5] both favour structural abnormality and stress the importance of a short first metatarsal, a hypermobile first segment, and that the metatarsal heads lie forward to Morton's line, from the sesamoids to the head of the 5th metatarsal. These conditions are also satisfied in the majority of feet in this series.

McMurray (1937) [6] pointed out that aching in a foot is a common feature for some time before the fracture is produced, thus inferring that metatarsalgia is a predisposing cause. This view is not supported by the present series in which no case gave a previous complaint of foot trouble. In all these cases the onset of pain was sudden and clearly coincident with the onset of fracture. Flavell (1943) [17] supports this in his recent series of cases.

Newell (1940) [7], in describing the condition, remarks that it is commonly found in soldiers, usually recruits, after long marches, carrying heavy packs and adds that there is no history of trauma and seldom of over-strain. Williams (1940) [8], described four cases in infantry soldiers and suggested standing rather than marching as the cause.

Brailsford (1935) [9], describing the radiological appearances, states that in its early stages there is merely ill-defined osteoporosis in the region of the metatarsal neck, later an appearance of fracture through this area, still later an amorphous deposit of calcium in what appears to be a subperiosteal hæmatoma and, finally, consolidated callus which becomes absorbed leaving the thickened shaft with a dense cortex.

Krause (1942) [10], comparing bone with metal, says that all solid material may lose its tensile strength through repeated strains. Ultimately a fracture may occur which is said to be due to exhaustion of material. Henschel has shown that "fatigue" fractures are preceded by changes in the crystalline structure of bone and lamellar bone is replaced by more fibrous bone with low calcium content.

The fatigue theory has been put forward by other authors in the ætiology of apparently similar types of fracture of other bones. Thus, Von Deutloff (1940) [12] describes 4 cases, 2 of the lower end of the femur and 2 of the tibia, in which pain and disability arose at the site of fracture after about six weeks of training. He suggested as the cause continued rhythmic and unaccustomed strain, particularly to the metaphysis of the bone. Peterson (1942) [13] describes a case of fractured femur coming on eight days after the beginning of training. Radiologically a crack was seen at the lower end of the femur, later followed by typical callus formation. Hambley (1942) [14] described 14 cases of fracture of upper end of the tibia in children and adolescents the oldest being 20 years of age. He pointed out that the interest lies in recruits and that spontaneous cure resulted from rest.

Brandt (1941) [15] considers overloading of importance, and gives the best ætiological summary by stating that march fractures are the result of rhythmically repeated sub-threshold

mechanical insults, acting by summation, to a point beyond the capacity of the bone to bear stress.

Wilhelm (1941) [16], describing 3 cases in men who were undergoing training, says they were not robust, had never played games nor done any athletic training and advises early athletic training and particular attention to strengthening exercises for the feet.

Flavell (1943) [17], in a recent article reporting 15 cases from the R.A.F., emphasizes the frequency of an atavistic anomaly of the foot, the absence of previous metatarsalgia, localization of pain to the affected area and complete cessation of pain after healing of the fracture. He further points out that X-ray diagnosis is unnecessary as the clinical syndrome is so characteristic and impresses the importance and success of ambulatory treatment.

The relation of footwear to ætiology has had very little consideration in the past. The Army boot differs in construction from the civilian shoe firstly in that it lacks flexibility in the sole. The action of the intrinsic muscles is thus altered, a heel-toe rocking movement occurring at the ankle-joint and movement at the metatarso-phalangeal joints being greatly limited. Secondly, the Army boot has a greater width anteriorly, thus allowing a considerably greater freedom to the fore-foot than in civilian shoes. Thirdly, the weight of the Army boot is much greater, which throws an increased amount of work on the tibialis anticus muscle with each step. In the substandard recruit, the poor-toned tibialis anticus readily tires on marching so that the fore-foot flaps heavily to the ground instead of there being an evenly-controlled roll forward from heel to toe as each foot comes to the ground. This flapping—a most noticeable feature when watching recruits marching—causes a considerable increase of the rhythmically repeated mechanical insults to the metatarsal heads.

The speed of marching is apparently of little importance. The average marching speed at this Centre was 3.9 m.p.h. During a three months period, as an experiment, no marching was done at a speed in excess of 3.0 m.p.h, but the incidence of fracture did not fall. Rather is it felt that the time spent on the feet is of greater significance, which is borne out largely by the fact that the majority of fractures occurred during the longer marches.

(B) *Treatment*.—The treatment of march fractures as described in the standard textbooks is immobilization in plaster for six weeks, followed by physiotherapy. According to most writers, weight-bearing should not be allowed for some eight to twelve weeks. The result of such treatment may produce sound healing of the fracture but what of the musculature of the foot and the rest of the body?

In the present war a welcome change in the treatment of most fractures is steadily gaining popularity, namely, the early use of movement and exercise. The treatment of march fracture is no exception. On the contrary, there is every reason for the institution of ambulatory treatment from the start. The treatment outlined under Series B has proved itself entirely satisfactory and the chief points in its favour are the rapid healing and early return to full duty, the fact that a great deal of the general physical and military training can continue uninterrupted, the complete elimination of hospitalization with its detrimental influence on a soldier and the satisfactory ultimate results. The average time spent away from completely full training by the 48 cases in this series thus treated was only twenty-seven and a half days as compared with some three months in hospitalized cases. This is a most important factor in these days of man-power problems.

Undoubtedly many cases of march fracture occur in the Army that are not diagnosed, being labelled foot-strain or metatarsalgia. This is probably because the pain is not severe and the majority of soldiers are not required to march continuously but have relatively long periods of comparative physical inactivity. It so happens that these cases of so-called foot-strain, which in reality may be march fracture, receive adequate treatment in their units by strapping and being excused marching and physical training for a short time.

V.—CONCLUSIONS.

(1) The incidence of march fracture in the present war is probably higher than recorded cases would indicate. This may be due to the fact that many cases are missed, being diagnosed as foot strain.

(2) The main factors in ætiology would appear to be as follows : (a) A poorly developed recruit with poor muscle tone ; (b) An unduly high ratio of weight of load carried to body-weight ; (c) A tendency to atavism of the foot ; (d) Prolonged and repeated foot strain ; (e) Change to the Army boot.

(3) Ambulatory treatment should in all cases be instituted early. Its main advantages are an early return to full duty, completely satisfactory healing and ultimate foot function, the elimination of hospitalization and the continued uninterrupted application of most of the physical and military training.

(4) The possible prevention of the condition of march fracture appears to lie in the attention in early youth to the proper physical development of the body and in particular early athletic training, including special exercises to develop and strengthen the foot. An adequate diet, rich in vitamins and minerals, should be a *sine qua non*. The tempo and duration of the recruit's training should be geared according to his physical standard.

Sufficient time should be allowed for the recruit to accustom himself to the transition from civilian to Army foot-wear and accurate boot fitting at the outset is essential.

(5) In all cases of pain in the foot following prolonged strain, such as marching, the possibility of march fracture should be borne in mind. The diagnosis seldom presents any difficulty, the history and clinical signs being so characteristic. Radiology may at first show nothing and should be repeated in all doubtful cases after two weeks.

VI.—SUMMARY.

(1) A brief outline of the object and training of an Army Physical Development Centre is given.

(2) A series of 64 cases of march fracture occurring at such a Centre is fully recorded, with statistical details.

(3) Physical and radiological findings are described.

(4) The ætiology is discussed and various views in the literature compared.

(5) Details of ambulatory treatment are given and the importance of this as the treatment of choice is stressed.

(6) Prevention would appear to lie along lines devoted to increasing sound physical development in early life.

I would like to express my thanks to Major A. N. L. Clark for his constant encouragement and help and to Major W. R. Playfair for his assistance and advice.

APPENDIX.

No. — PHYSICAL DEVELOPMENT CENTRE.

Pro-forma for use in Follow-up cases of March Fracture.

Number.....Rank.....Name.....P.D.C. Serial.....
 The above named attended course No..... at No.....P.D.C. From / / 44 to / / 44
 He sustained a March Fracture of.....on / / 44.
 May the following information please be supplied :—

PART A. To be completed by Company Officer.

1. What duties and training has he performed since / / 44 ?
2. What are his present duties ?
3. Record of Route Marches performed since / / 44 ?

4. Record of other physical activities.

5. General Remarks.

Signed.....

O. i/c Coy.

PART B. To be completed by Medical Officer.

1. Patient's account of his foot condition since / 44.
2. Has he reported sick since / 44 ? If so, give details.
3. Has he had any period of light or modified duties because of foot condition ?
4. Report on present foot condition.
5. Present Medical Category.....
6. Any other relative remarks.
7. An X-ray plate, A-P view of the fore-foot would be greatly appreciated.

Signed..... R.A.M.C. .
M.O. i/c.

Remarks.

Signed.....
Officer Commanding.

Station :

Date : 44.

REFERENCES.

- 1] BREITHAUP (1855). *Med. Ztg. Berl.*, **24**, 169.
- 2] PAUZAT, J. E. (1887). *Arch. Med. Pharm. Milit.*, **10**, 337.
- 3] JANSEN, M. (1926). *Jl. Bone and Jt. Surg.*, **8**, 262.
- 4] MORTON, D. J. (1927). *Ibid.*, **9**, 531.
Idem (1928). *Ibid.*, **10**, 187
Idem (1930). *Amer. Jl. Surg.*, **9**, 315.
Idem (1935). "The Human Foot," New York.
- 5] DODD, H. (1933). *Brit. Jl. Surg.*, **21**, 131.
- 6] McMURRAY, T. P. (1937). "Practice of Orthopædic Surgery," London.
- 7] NEWELL, C. E. (1940). *Southern Surg.*, **9**, 111, 169.
- 8] WILLIAMS, A. A. (1940). *Brit. Med. Jl.*, **2**, 784.
- 9] BRAILSFORD, J. F. (1935). "The Radiology of Bones and Joints," London
- 10] KRAUSE, G. R. (1942). *Radiology*, **38**, IV, 473.
- 11] FUSS, H. (1941). *Med. Klin.*, **37**, No. 49, 1219.
- 12] VON DEUTOFF, J. M. (1940). *Acta Radiologica*, **21**, VI, 615.
- 13] PETERSON, L. T. (1942). *Jl. Bone and Jt. Surg.*, **24**, I, 185.
- 14] HAMBLEY, J. B. (1942). *Brit. Jl. Surg.*, **30**, No. 117, 9.
- 15] BRANDT, G. (1941). Abs. In Year Book of Radiology, 35.
- 16] WILHELM (1941). Abs. *Bulletin of War Medicine*, **2**, III, 188.
- 17] FLAVELL, G. (1943). *Lancet*, **2**, 66.

FOOT STRAIN IN THE SERVICES.

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PAIN in the soldier's fore-foot is a common cause of disability, particularly during early training but also at latter ages of service. Personal experience, over a period of eighteen months at home stations, showed that of all surgical cases from different types of units referred for specialist opinion some 30 per cent had fore-foot pain. During a similar period, among surgical out-patients at overseas stations, roughly 15 per cent came because of this complaint. The true incidence is probably much greater than these figures indicate as many foot complaints do not reach the stage of an out-patient department of a military hospital.

Generally these cases were referred to the Surgeon for advice and recategorization on account of anatomical deformities of the feet. It was clear that the complaints of pain had been regarded by the R.M.O. as a manifestation of the anatomical deformity and that its treatment, therefore, was an essential pre-requisite of relief of pain. In fact many had already been treated by various boot corrections and arch supports. That this is a wrong attitude is borne out by an analysis of 562 out-patients with foot troubles. In approximately 80 per cent of these the cause of the pain was found to be due to ligamentous strain following muscular fatigue. Gross abnormalities and markedly poor muscular development usually keep men out of the Army altogether, or in very low categories, and such cases are not considered in this paper. Mild structural deformities occurred in rather more than half the cases; their symptoms differed in no essential from those cases of strain in feet of anatomically normal shape and their presence was seldom found to be of more than minor significance in the causation and treatment of the condition. There were, in all, 419 men with and without structural deformity in whom foot strain was diagnosed as the main factor in the disability and it is these cases that form the subject of this paper.

CLINICAL PICTURE.

The history of pain in the foot following exercise—usually drill or a route march—is almost constant. Many admitted to some trouble in civilian life but accommodation to this had been a simple matter. The pain is often described as having a severe burning character, aggravated at each step when weight is taken on the foot. It affects the mid-sole, often just proximal to the ball of the great toe and the tread of the fore-foot; with weight-bearing it extends to the level of the metatarsal heads. An aching tiredness ascends to the leg along the medial, less often the lateral, aspect of the ankle. Standing at attention has the worst influence on the pain; rest in bed, with the feet raised, gives most relief. Boots, previously comfortable, are described as having become intolerably tight and heavy. Following a period of bearable though painful discomfort and tiredness of the feet on exercise, an acute severe metatarsalgia may appear suddenly during a long route march. Such an acute strain, probably of the plantar fascia, forces the man to drop out of the march and is often the reason for his first appearance before the medical officer.

After a period of "excused strenuous exercise" the feet feel better but the burning ache recurs on further exertion. Later it is aggravated by smaller amounts of exercise and the man is successively excused route marches, drill, guard duty, P.T. and so on until he becomes a constant attendant at sick parades and a figure of suspicion to all. His general physical condition deteriorates because of lack of exercise. He begins to lose faith in himself and is worried that he has so little to show objectively for his many complaints and disabilities. He tends to magnify any slight anatomical deformity that may exist and to locate the pain in the area of the deformity. Suspicion of his integrity increases with his shifty and awkward

behaviour. Larger boots, light boots, shoes, various footwear "corrections" and, finally, plimsolls all fail ultimately to ease his aching feet and lighten his miserable outlook.

The recently and acutely strained foot is swollen and of a blotchy red colour accompanied by increased perspiration. There is general tenderness on active and passive movements in all directions and on pressure anywhere over both sole and dorsum. Areas of especial tenderness are usually found on pressure on the sole just behind the tread of the fore-foot, between the heads of the metatarsals and in the mid-sole towards its medial border. A metatarsal bar will press on these tender areas and the history of increase of pain after "bar corrections" is common. Occasionally a point of exquisite tenderness is found and is suggestive of a fibrositic nodule. In early stages of muscular fatigue the toes may be hyperextended and active flexion is weak and painful. Later, and in chronic cases, the middle toes are flexed at rest and passive extension as well as flexion against resistance aggravates the pain in the sole. Splaying the fore-foot is painful and may be unbearable; lateral compression often relieves. The stance is shifty and weight is taken mainly on the heels. The gait is an awkward one designed to reduce the time and pressure of weight-bearing in the take-off phase of walking.

There may be bony evidence, more often of a chronic but also occasionally of an acute strain. Where tenderness and swelling are marked over the dorsum of the middle three metatarsal heads and necks, bony lesions should be sought radiologically. March fracture of a metatarsal neck and Köhler-Freiberg disease of a metatarsal head may follow repeated minor trauma such as occurs in a fatigued foot. In this series there were three of the former and one of the latter lesions.

Many grades of severity of symptoms and signs occur, varying from the acute recent strain to the chronically stiff and painful foot. However, the clinical picture outlined above is, in general, common to all cases with or without mild anatomical abnormality. The cause is over-use, fatigue of the muscles of the foot that support body-weight and consequent strain of the ligaments. The outstanding circumstance in which this occurs is that of a too rapid change over from relatively inactive occupations to the full stress of military life. This plays the most important role, too, in feet which exhibit structural changes. The additional influence of such alterations upon the clinical picture and treatment is considered under separate heads.

Corns and "Minor" Affections.

A mechanically disadvantageous stance and gait is a common protective reaction to the presence of a painful focus on the foot. The rubbing of the boot on a corn or blister, the painful tread upon a callosity or wart, the traumatic arthritis of a stubbed great toe, the pain of an ingrown toe-nail, the discomfort of epidermophytosis, a badly darned or ill-fitting sock, are all obvious examples of conditions which may throw the foot out of its normal position of balance and tread. Under such conditions the muscles fatigue much more readily and foot strain is soon added to the focus as the major source of disability. Both sources of trouble require treatment. A not uncommon local condition for which routine examination is required, as it is otherwise apt to be overlooked, is tendovaginitis of the long extensors, especially of the tibialis anticus in front of the ankle, where tight lacing or a fold in the tongue of the boot may repeatedly rub on the tendon and its sheath. The assumed gait limits movement of the ankle. Similarly, in achillodynia, extension at the ankle is avoided by shortened stride of the other limb and restriction of pressure on the tread in the take-off. Both these conditions are potent precursors of foot strain.

A mechanically unsound balance may be habitual and not assumed as a result of painful foci. Varying degrees of "Charlie Chaplin" gait and poorly developed trunk and limb muscles may throw weight-bearing out of proper alignment. Such habits, if not corrected, will give rise to repeated recurrences of foot strain.

However successful and firm is the local repair of the grosser injuries, such as sprain of the ankle, Pott's fracture and fractures of the tarsal or metatarsal bones, they will give rise to intractable chronic foot strain unless careful and graduated re-education of the foot muscles is part and parcel of the treatment from the start.

DEVELOPMENTAL ABNORMALITIES OF THE FIRST METATARSAL.

There are three developmental abnormalities, viz. a short metatarsal, an unduly mobile metatarsal and metatarsus varus, which generally give little or no trouble in non-strenuous occupations but which, with sudden increase in exercise, often lead to muscular fatigue. Such feet are potentially weak because of lack of proper weight-bearing function by the ball of the foot. If the abnormalities are recognized and gradual foot training instituted a sufficient development of muscular power can be achieved to maintain a category of B2 and sometimes A2.

Hallux Valgus.—There were 34 cases of hallux valgus associated with foot strain in the series. Seven were associated with one or more of the above developmental abnormalities. In 12, there was a history of its recent appearance or marked accentuation. This story is too commonly obtained from trustworthy witnesses to be regarded invariably as an attempt to prejudice a post-war pension. In some cases there has been a medical officer's supporting evidence. Such onset of deformity always followed a period of pain on exercise. In the remaining cases valgus had been present for many years but had never before given rise to the severe breakdown occasioned by Service training. Symptoms and signs of pressure on the "exostosis" were found in four cases and marked osteo-arthritis of the metatarso-phalangeal joint in three.

Treatment is based upon recognition of the main, and sometimes primary, element of the disability, namely foot strain. Footwear corrections to relieve direct pressure upon a bunion and metatarsal bars or pads to relieve the pain of pressure and movement at a joint which is the seat of arthritis are reserved until muscular re-education is attained and for the limited proportion of cases requiring them.

Hallux Rigidus.—Hallux rigidus was present in 28 cases of foot strain. A history of stubbing the great toe was given as the determining cause in 12 cases. These cases illustrate the importance of proper treatment of what appear to be minor traumata of the foot. A stubbed great toe requires rest until the synovitis or hæmarthrosis has settled and muscular spasm is overcome and then graduated active exercises of all the foot muscles until A1 fitness is regained. Once hallux rigidus appears, and more so if foot strain supervenes, restitution to A1 is much more difficult and many cases require downgrading.

Lower grading was necessary in the presence of osteo-arthritis of the metatarso-phalangeal joint and also in three cases associated with metatarsus elevatus. If this condition of abnormal elevation of the head of the first metatarsal is recognized, training can be suitably graduated to prevent the sequels of hallux rigidus and foot strain.

In the established case, pain may be described as affecting the great toe and ball of the foot but strain is nearly always the chief disabling feature and is the explanation of the common story that metatarsal bars have "made things worse." After treatment of the strain and redevelopment of muscles the bar is of value when movement at the metatarso-phalangeal joint is still tender. The bar requires repeated attention: it should be thick and wide enough to prevent upward pressure on the terminal phalanx, and therefore forced dorsiflexion, of the great toe at the final phase of take-off in walking.

Operations for both hallux valgus and rigidus in Service personnel are notoriously unsuccessful. It seems that if muscular development sufficient for Service cannot be achieved without operation there is a still less chance of success after operation. Amputations of the great toe and excision of the head of the first metatarsal are particularly culpable in creating a foot so mechanically weak as to make it impossible to restore a military standard consistent with any but the purely sedentary categories.

Hammer Toe and Overlapping Little Toe.—In all cases of foot strain in which hammer toes or overlapping fifth toe were present pressure pain by boots was a factor in causing or prolonging the muscle fatigue. The common complaints are related to the deformity and symptoms indicative of ligamentous strain are seldom given spontaneously. The importance of deliberately seeking for evidence of strain is apparent from the many failures of treatment

when it is directed solely to the deformity. Operative measures, such as tenotomy plus manipulation and interphalangeal arthrodesis for hammer toe and amputation for overlapping fifth toe, are sometimes indicated to break the vicious cycle of the painful focus—imperfect balance and tread—muscular fatigue and strain—and further aggravation of pain in the original site. Rehabilitation of the whole foot takes precedence over operative treatment for the degree of the former determines the success of the latter.

"Flat Feet."—The degree and extent to which pes plano-valgus affects the onset and progress of foot strain is difficult to assess. Gross valgus deformity of developmental, paralytic or traumatic origin must play an important causative role but it is doubtful whether the mild degrees of the deformity commonly found in Service personnel are ever primary factors in the cause of foot troubles. The doubt arises for a number of reasons. Firstly, there is the occasional reliable history of the appearance of pes plano-valgus *after* several attacks of foot strain. Secondly, as was found in roughly half the number of this series of cases, indistinguishable symptoms and disabilities occur in feet which, both at rest and on weight-bearing, are anatomically normal in shape and their reaction to treatment is much the same as in those with deformity. A third considerable fact is that many men are able to undergo the severest stresses of A1 category service despite their possession of plano-valgus feet. This last reason, furthermore, throws doubt upon the postulate that plano-valgus necessarily gives rise to a mechanically unsound foot and so conduces to the origin or perpetuation of foot strain.

These facts have an important bearing on treatment. "Correction" of the deformity by boot wedges or arch-supports has no sound rational basis. In practice it produces most disappointing results, not only by failing to relieve symptoms and maintain a satisfactory category of functional ability but in its greater evil of ultimately giving rise to the most intractable forms of chronic foot strain that are found in Service personnel. It seems clear, therefore, that it is of great value practically to regard all cases as primarily due to muscular fatigue and concentrate treatment upon this aspect so as to tune the muscles to a maximum efficiency.

Splay Foot and Claw Toes.—Splay foot is a common associate of foot strain, both in the presence as well as the absence of plano-valgus. The additional common sign of pain on passive spreading of the fore-foot has sometimes led to a form of treatment by which the fore-foot is bandaged or strapped to maintain side-to-side compression. Such compression may ease pain at rest but it is a form of torture seldom tolerated by the soldier on his feet.

As indicated in the description of the clinical picture, clawed toes are a sign of foot strain. It is probably due to reflex contraction of the flexor brevis, in acute stages to prevent pull upon a partial tear, fibrositic nodule or myalgic area within its substance and, in chronic stages, to relieve the pain of strain of the anterior portions of the plantar fascia. The lesions in both stages are due primarily to muscle fatigue and over-use injury.

That claw toes and splay foot are signs, and not precursors, of foot strain is strongly supported by the frequency with which moderate degrees of the deformities disappear or are forgotten when efficient muscular power is restored.

Pes Cavus.—Experience of treatment of foot strain in a cavus foot in this series of cases was a gloomy one. Not one of the eleven, despite supervision of the periods of rest and the progress to full muscular exercises, could be brought to, or maintained in, an A or B2 category. Recurrences of acute foot strain were frequent. The men could often run and skip well, even play an active part in a game of football, but military drill, particularly marching and standing at attention, caused a breakdown. The capacity for running but not for standing was also striking in three men who had long narrow feet without cavus deformity. Most of these cases ultimately come to category B7.

Short Tendo Achillis.—Another deformity, by appearances a slight one, is in fact severely disabling. The shortened tendo Achillis is a potent cause of foot strain and the task of compensating for it by muscular re-education sufficient for any category higher than B7 has so far failed.

PREVENTION AND TREATMENT.

Aspects of the prevention and treatment of foot strain have largely been indicated in previous sections. Some broad issues of prevention and the regime of treatment and re-education of the broken down foot remain to be dealt with here.

Because foot troubles involve a considerable loss of time and man-power the Army authorities have done much to disseminate knowledge of the management of feet. Perhaps the many duties of Service personnel detract from the disciplinary enforcement of adequate foot care and hygiene but such action would bring its rewards in preventing many cases of strain. A great deal of the practical advice given in the official publication on chiropody [1] could, with profit, be an essential part of the course of training for all junior officers and N.C.O.s. Most of the cases sent to hospital for minor chiropody might well have been attended to by the men themselves ; their ignorance of simple measures is often astounding.

Foot strain is the result of the overuse of muscles insufficiently developed and re-educated after relatively inactive occupations. This raises the difficult problem of gradation of training. The suggestion [2] that men with substandard feet be segregated at the recruiting stage and trained separately offers partial solution. The instructors themselves would necessarily be especially selected and trained for the work.

Under usual conditions of training and duty men should be encouraged to report even minor foot complaints at an early stage so as to enable the medical officer to prevent the frequent major disabling sequels. This is particularly important in regard to foot strain where the most favourable results of treatment are obtained in the early acute cases. Progressive deterioration of the foot is rapid if muscular fatigue is not adequately treated as soon as it appears and the most difficult and disappointing cases to handle are those chronic strains which have undergone repeated acute exacerbations.

The *treatment* of foot strain may be divided into three stages.

(i) A period of absolute rest in bed. This is essential, as no form of physiotherapy (apart from heat) or rehabilitation can succeed before fatigued muscles have rested and spasm has been overcome. The average period is from two to five days.

(ii) A period of non-weight-bearing exercises. Detailed instructions as to the regularity and form of exercises are given. Gradual progression is the aim : from simple rhythmic flexion and extension of the toes within the limits of pain, progressing with increasing effort and in association with movements at the ankle, knee, and hip-joints, to full efficient muscular activity. On the first day exercises are conducted for five minutes every alternate hour, subsequently at hourly intervals. During this stage of active exercises in bed, lasting from three to six days, light massage and contrast baths are helpful. In this period, too, foci of pain are treated, e.g. injections of anæsthetic solution for the occasional fasciitis or myalgic " nodule," removal of corns and callosities, etc.

(iii) A period of weight-bearing exercises. Here, again, progress is graduated. The patient gets up only for the period of the exercise (five minutes per hour of the day) at first ; later he remains " up " between exercises. Within seven days he changes to a regime of four ten-minute exercise sessions and, later, to two half-hourly periods in preparation for the P.T. class. Weight-bearing exercises are designed to correct stance and gait and to achieve full muscular power in balance at rest and in propulsion.

During the third phase of treatment the question of manipulation arises. Persistent pain in the presence of improved muscle power, and not stiffness, partial mobility or mild deformity, is regarded as the indication for manipulation. The fact that the more movable the joint, the more valuable is manipulative treatment, has been stressed by Watson-Jones [3]. When manipulation is indicated, it is performed according to the technique described by Bankart [4].

At the conclusion of treatment, varying from two to six weeks after admission to hospital, the case is assessed and categorized.

SUMMARY AND CONCLUSIONS.

Roughly one out of every four or five surgical out-patients presents because of foot strain and approximately half the cases have mild structural deformities. The clinical picture, the features of which are described, is essentially the same whether the anatomical structure is normal or altered.

The incidence of the common deformities and their place in the fatigue syndrome of the foot is discussed. Deformities are probably sequels of foot strain in a much larger proportion of cases than were considered justifiably proven in this series. In addition to the supporting theoretical desiderata, it is argued that it is of appreciable practical profit to regard all cases as primarily the result of over-use muscular fatigue and to treat cases from this point of view. The adoption of this attitude is emphatically indicated by the almost uniform failure of boot-wedges, bars and arch supports and the patent evidence that the minor foot operations of civilian practice produce major disabilities in Service personnel.

Adequate foot hygiene and thorough early treatment of minor ailments and injuries are essential measures in the reduction of the incidence of foot strain. Further reduction can be achieved by more gradual and selective training ; the essence of the problem being to educate muscles, whatever the anatomical form of the foot.

The treatment of acute and chronic foot strain is considered in three stages : absolute rest in bed ; active exercises in bed ; and lastly the stage of weight-bearing exercises. Adequate treatment requires hospitalization for two to six weeks.

REFERENCES.

- [1] " Army Manual of Chiropody," 1931. The War Office.
- [2] TODD, A. H. " Treatment of Flat Feet in Recruits," *Med. Press and Circ.*, 1941, August 13, 130-6.
- [3] WATSON-JONES, R. " Fractures and other Bone and Joint Injuries," E. & S. Livingstone, 2nd Ed., 1941, 609.
- [4] BANKART, A. S. BLUNDELL. " Manipulative Surgery," Constable, 1932, 45-47.

THE DIAGNOSIS AND MANAGEMENT OF PYREXIA IN WARTIME

(WITH SPECIAL REFERENCE TO AFRICA).

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THE diagnosis and management of pyrexia, without localizing signs, present an ever-difficult problem and this is specially so in the tropics amongst different nationalities and races in whom, in addition to the universal fevers, malaria with all its manifestations has to be added.

Pyrexia may be classified from the clinical aspect as occurring in three groups of diseases :—

- (1) Lethal diseases which are amenable to specific treatment.
- (2) Serious diseases for which no specific treatment is at present available.
- (3) Trivial diseases.

Attention should be primarily directed to exclusion of, or any indication for, Group 1 rather than to make an immediate definite diagnosis. It must be emphasized that little harm can accrue if the others are at first erroneously thought to be included in the first group. Subtertian malaria, for instance, must always be regarded as treacherous and dangerous in the non-immune and it may in them assume so many disguises that even the most experienced may be deceived. Indigenous natives, or European residents in the tropics, may be infected with one or more parasitic disease at the same time but, in Africa, immunity to malaria plays an almost decisive part ; so much so that (in many parts of the tropics) two great classes of patients can be said to exist—those *immune* and those *non-immune* to this fever ; the former, with the possible exception of Kikuyu, consisting of the majority of native Africans who have been infected with malaria plasmodia from childhood upwards and the latter of Europeans and some Asiatics. This immunity, which protects the African in highly endemic areas from the lethal effects of malaria, is known as *premunition*, that is to say, it requires the presence of living plasmodia to maintain its potency. The discovery of malaria parasites in a blood-film *does not*, in these people, necessarily denote active malaria as the cause of pyrexia. It has been shown, however, that even immune Africans, when removed for some time from their homes to less highly endemic areas and re-exposed to infection, often suffer from sharp bouts of malaria. Again immune Africans suffering from incidental infections, such as pneumonia, often show a considerable degree of malarial parasitization and this may lead the diagnostician astray as to the real cause of the fever.

Procedure.—In an African, the first step should be to ascertain his tribe, his potential immunity to malaria, the possibility of exposure to this infection and recent movements. Diagnosis based on these meagre data may not be possible but it is imperative to be able to exclude certain dangerous infections which are amenable to specific treatment. These comprise bacterial and coccal infections (streptococci or staphylococci) ; pneumococcal, meningococcal and other forms of septicæmia ; pneumonia ; cerebrospinal and other forms of meningitis and malaria, bearing in mind that the most rapidly fatal forms are those marked by the cerebral complications.

Cerebral Irritation Present.—The grosser manifestations of cerebral irritation, such as epileptiform convulsions, conjugate deviation of the eyes or coma, are scarcely likely to be

overlooked but the early and finer changes in personality are not necessarily so obvious and have to be searched for by methodical appreciation of the patient's *cognition* (flow of ideas), *affection* (mood) and *conation* (behaviour) which can be gained during routine examination.

It is characteristic of cerebral irritation that the *affection* is primarily disturbed producing typical non-coöperation and irritation. *Conation* may be abnormal, irrational or, it may be, hysterical. Thus the patient lies down when asked to sit up, resists examination and is in general awkward and un-cooperative. The examiner must be aware that such behaviour in a febrile patient is probably due to cerebral irritation and that this change in *affection* and *conation* is just as significant as are the more obvious signs. We may assume then, if cerebral irritation is present, the probable significance may be :—

In the immune to malaria—*meningitis*.

In the non-immune—either *cerebral malaria* or *meningitis*. Conjunctival petechiæ, if present, denote a septicæmia, probably meningococcal. Slight rigidity of the neck muscles may be overlooked but usually nuchal stiffness produced by meningitis increases with every attempt at flexion. A blood slide examination must, of course, be carried out in every pyrexial case exposed to malarial infection. Next a lumbar puncture is most important.

There are many conditions which produce cerebral irritation but cerebral malaria and cerebrospinal meningitis are the usual and otherwise rapidly fatal diseases which are now most amenable to specific treatment. Three other diseases have to be mentioned as liable to be encountered in Africa, *relapsing fever*, *trypanosomiasis* and *heat stroke*. The former (either *Spirocheta duttoni* or *S. recurrentis*) may be seen from time to time and may present the picture of acute cerebral catastrophe. Trypanosomiasis in the early stages, especially in Europeans, may present itself as acute cerebral irritation with changes in *affection* and *conation* as already described. Heat stroke is not common in Central Africa. The readily available laboratory confirmation is diminution in the urinary chlorides and this is specially the case when complicated by diarrhoea or superadded dysentery. This possibility must always be kept in mind in states of resistive stupor which closely simulate cerebral malaria. In case of doubt the wisest course is to treat both for cerebral malaria as well as heat stroke.

Cerebral Irritation Absent.—The case must be reviewed with special attention to the following points :—

- (1) Intensity of general symptoms—rigor, shivering, vomiting, malaise or headache.
- (2) The circulatory response (pulse-temperature ratio).
- (3) The respiratory-pulse ratio.
- (4) The presence or absence of obvious distress.
- (5) Changes in the skin.

Rigor denotes acute toxæmia—in the malarial-immune pneumonia would be suggested. In the non-immune vomiting with pyrexia accompanies malaria especially, as so often happens, if the vomit is bilious, bloodstained or containing altered blood.

The Respiratory-Pulse Ratio.—In respiratory infections, such as pneumonia, this ratio is decreased so that it tends to fall to 3 - 1, or less, such a ratio at once suggesting the localization of the process to the lungs.

The Pulse-Temperature Ratio.—The pulse-rate increases with the rate of metabolism due to pyrexia. With a temperature of 103° F. a pulse-rate of 100 should not indicate any unusual circulatory response, whereas a rate of 120 or 140 with such a fever would suggest the direct effect of toxæmia on the pulse-rate as is characteristic of zymotic diseases such as scarlet fever or smallpox.

Distress sums up the degree of psychical and physical disturbance brought about by the toxæmia and forms a valuable indication of the seriousness of the illness in those who are unable to express their sensations.

The Skin.—Observation of the state of the arterioles and capillary tone of the skin should be directed towards the colour, warmth and return of the circulation after blanching by pressure. When warm with engorged arterioles the return of colour is immediate but, when cold and clammy, the opposite holds good, the capillary tone is poor and return of colour

is delayed and provides a simple means of indicating whether the circulation is stimulated or depressed.

In the malarial-immune circulatory stimulation suggests a bacterial septicæmia. If, on the other hand, the respiratory pulse-ratio is decreased, pneumonia or some pulmonary infection should be suspected. Sputum examination is especially important in natives in whom it is usually scanty and difficult to obtain. If blood-stained or rusty the diagnosis of pneumonia is provisionally confirmed. If much blood is present, on the other hand, tuberculosis, so common in native races as a cause of pyrexia, is a possibility.

Febrile albuminuria is usually more marked in native Africans than in Europeans but a heavy albuminuria with the presence of casts in the early stages of pyrexia is suggestive of yellow fever in areas where such a possibility might reasonably be suspected. Pus cells and large numbers of coliform organisms in the deposit suggest a *Bacterium coli* pyelitis or septicæmia as the cause of pyrexia, a condition which is very frequent in tropical practice.

In the non-immune group it is important to examine both thick and thin films for subtertian malaria parasites. In primary attacks parasites are often scanty and sometimes the ring forms are very small with a fine rim of protoplasm and are therefore difficult to detect ; therefore it is much safer to examine blood-films at six-hour intervals when scanty infections are often revealed which otherwise would have been missed. If there are signs of circulatory disturbance, as described, quinine should be injected by the parenteral route. *When in doubt quinine or mepracrine should always be given.* This is a golden rule for, if treatment is withheld, the hours of grace are lost for ever. Avoidable deaths from subtertian malaria often occur in the newly arrived non-immunes who may show no obvious parasitization in the first blood examination and often little clinical evidence of really severe illness.

It is possible from a preliminary blood examination to estimate whether a leucocytosis is present and a good indication for treatment can in this manner be obtained. Therefore cases showing definite signs of toxæmia with leucocytosis, but negative to malaria, can *à priori* be reasonably regarded as suffering from some bacterial infection.

Two main errors are usually made by doctors newly-arrived in Africa and inexperienced in these puzzling pyrexias.

(1) Treating non-immunes who are suffering from malaria as some other febrile illness, sometimes with fatal results.

(2) Treating immunes as malaria, whereas in fact they are suffering from some totally different illness, with consequent waste of quinine and loss of valuable time.

Physical examination includes the inspection of ears, nose, throat and sinuses for localizing signs ; assessment of the main features of the temperature chart, whether remittent, intermittent or sustained and whether there are any other characteristic excursions, such as double crisis or undulations. The short, sharp febrile type of sandfly fever and the saddle-back of dengue are instances in point. *Special points* must also be noted, such as the number of days fever has persisted, whether quinine or other anti-malaria drug has been given and the total amount. In the *immune*, fever of more than three days' duration, especially under anti-malarial therapy, is unlikely to be due to malaria. No reliance can be placed in those completely immune to malaria on enlargement of the spleen as a diagnostic sign of the fever as splenomegaly is necessarily an essential accompaniment of immunity. *The presence of numerous malaria parasites in the blood may mean that such a patient is suffering from malaria* but, if scanty, they are probably of no essential significance.

In *non-immunes*, however, the opposite holds good. Thus fever up to five days' duration, even with effective quinine therapy, may still be due to malaria.

In the non-immune splenomegaly is a very valuable clinical diagnostic sign. Here the presence of malaria parasites in the blood, however scanty in numbers, indicates that the patient is suffering from malarial fever, even should evidence be detected of some other coexisting disease ; though exceptional, *still it is possible to be suffering from subtertian malaria, even in the absence of demonstrable parasites in the peripheral blood.*

Necessarily this entails a different management in each class of case. Thus :—

(a) In *immunes* it is better to withhold specific quinine or mepacrine therapy till the appearance of suggestive physical signs.

(b) In *non-immunes*, who have recently been exposed to malaria infection, it is best to institute quinine therapy and then to examine the urine by the Tanret test to prove whether it has been absorbed. If not it should be injected intramuscularly.

If after three days the pyrexia still persists in both immunes and non-immunes it is possible to subdivide the fevers roughly into : (1) A leucocytic group, and (2) A group with normal leucocyte count or even leucopenia. Each of these groups may be further subdivided into those of over and those under seven days' duration.

LEUCOCYTIC GROUP.

With Eosinophil Leucocytosis.—In Africans and others long resident, eosinophil leucocytosis is very frequently found and may be due to some helminthic infection, such as bilharziasis (*B. mansoni*) in the early stages, but is more usually of filarial origin (*Loa loa* or *Acanthocheilonema perstans*) which evokes a high eosinophilic response. There is also the newly described *tropical eosinophilia*¹ which appears to be a distinct entity and is accompanied by a very high eosinophil leucocytosis, often associated with bronchitic or asthmatic symptoms.

With Polymorphonuclear Leucocytosis.—In fever lasting under seven days the pyrexia is often caused by atypical bacterial pneumonia. This lung infection may be present even in the absence of cough, distress or dyspnoea, and can be revealed solely by radiography. Here again there are exceptions because some atypical bacterial pneumonias are accompanied by a normal white cell count or even leucopenia.

A polymorphonuclear leucocytosis in fever of over seven days' duration may indicate the presence of intrahepatic or subdiaphragmatic pus, pelvic, perirenal, cerebral, pulmonary suppuration or, sometimes, even affections of the facial sinuses. These may declare themselves by appropriate physical signs. Perhaps the most silent area is the liver and this involves a separate study, even in the absence of dysenteric history and *Entamoeba histolytica* cysts, demanding concentration on compression signs at the base of the right lung.

With normal leucocytes or leucopenia pyrexia is characteristic of insect-borne virus diseases, including sandfly fever, dengue and yellow fever, all of which have some other feature such as conjunctival congestion and the jaundice of the latter. Hæmorrhagic smallpox in which the rash becomes visible in the first forty-eight hours must always be suspected in patients who are desperately ill.

In louse and tick-borne forms of typhus there is the headache and rash (on fifth-seventh day) to guide us and, most important of all, a positive Weil-Felix reaction but, in the tick-borne form in E. and S. Africa, the rash is often indistinct, appearing only on palms of hands and soles of feet and the primary sore or eschar is often so small as to be difficult to see. In fever lasting over seven days a normal white count or leucopenia persists in primary atypical pneumonia which may sometimes simulate malaria and in infections by the enteric or *Salmonella* groups. Agglutinin response may not occur till the fever has lasted over fourteen days, especially in native Africans, but in these patients the complicating factor of residual agglutinins need not as a rule be considered. Blood and faeces cultures remain the surest methods of establishing an absolute diagnosis. The characteristic rose spots in coloured skins may be impossible to distinguish.

Meningococcal septicæmia may produce a malaria-like pyrexia and can best be diagnosed by blood culture, by the appearance in some cases of subcutaneous nodules and, in Europeans, often by an erythematous rash on the legs and extensor surface of the arms. The response of this fever to sulphapyridine is often diagnostic. Tuberculosis has always to be thought of and may be of pulmonary, abdominal or miliary types.

In the *undulant fevers* (melitensis and abortus types in Africa) the rheumatic-like pains and profuse sweats are the clinical sign-posts. A blood culture is usually successful in the

¹ See following paper.—ED.

early stages and later agglutination tests are positive and there are also the *melitine* and *abortin* intradermal tests.

In *kala-azar* the sign-post is the pronounced leucopenia and there is also usually, in a well-established case, a positive serum globulin test. The double-rise, or double crisis, in the temperature chart is not by any means observed in every case.

Amæbic dysentery, especially when complicated by hepatitis, may be accompanied by prolonged low fever. The only practical method of diagnosis is the discovery of *E. histolytica* cysts in the fæces and added to this may be response to emetine therapy.

Chronic *Bact. coli* infections cause either chronic pyelocystitis, or miliary cortical renal abscesses, accompanied in the tropics sometimes by *Bact. coli* septicæmia and are more frequent in tropical practice. Blood culture is always worth while and the organisms can be demonstrated in large numbers in the urine.

Finally it may be stated, that if continuous pyrexia has persisted for over three weeks without adequate cause having been discovered, other possibilities have to be thought of. There may be many hidden foci of infection but, in the first (polymorphonuclear leucocytic) group, amæbic abscess of the liver and, in the second (normal leucocytic or leucopenic), lymphadenoma, miliary tuberculosis or ulcerative endocarditis, which have often got to be diagnosed by a process of exclusion, are most probable.

We wish to thank Brigadier E. R. Cullinan, Consulting Physician, E.A.C., for his help and the D.M.S., E.A.C., for permission to forward this paper for publication.

TROPICAL EOSINOPHILIA: AN ÆTIOLOGICAL INQUIRY.

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INTRODUCTION.

THE existence of a disease-entity characterized by cough, sputum, increasing loss of weight and massive eosinophilia, has been recognized in India by the term "Tropical Eosinophilia." In this paper I shall record the case-report of an African native who was kept under observation for a period of sixteen weeks in an attempt to discover the obscure ætiology of this interesting tropical condition.

OBSERVATIONS.

In his original paper, Weingarten [1] described a series of eighty-one cases occurring in Indians and in Europeans domiciled in India. He regarded the disease as peculiar to certain parts of India. Conceivably, the condition is peculiar not only to India but to other tropical and sub-tropical countries. In Weingarten's series the disease affected males in the ratio of 8 : 1, the age-incidence being 25-45. The course of the disease was chronic but benign. The medical literature accessible to me in my peripatetic career offers scanty reference to this condition; a single reference reads as follows: "Tropical non-parasitic Eosinophilia; obscure; may be transient; sometimes familial" [2].

CASE PROTOCOL.

The present case was studied in an adult African male from Tanganyika serving with the East African Forces. Precise ages are not obtainable in African subjects so that this soldier's age would be in the 25-30 group.

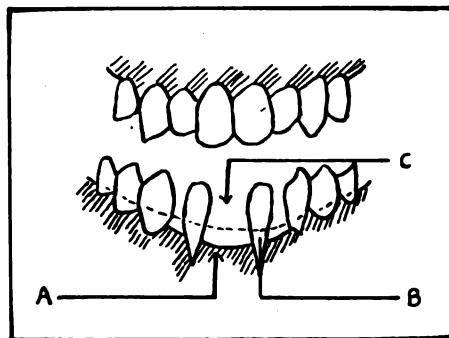
Onset.—The presenting symptoms were acute febrile onset, with cough, purulent sputum, retrosternal pain and weakness. Clinically, the conjunctivæ were inflamed; in the chest, breath sounds were absent while added sounds were generally present; in the abdomen, the spleen was enlarged two fingers'-breadth (not tender). There was no generalized lymphadenitis.

Febrile periods (one to five weeks.—Evening rises of temperature with increasing signs in the chest continued for a week. At this stage bronchopneumonic consolidation was detected and per-oral sulphapyridine started; the temperature fell to normal within twenty-four hours. A total dosage of 17 grammes was given in five days, then discontinued. After a period of six days the temperature rose again to 99° F. On the ninth day the exhibition of sulphapyridine was repeated; on the next day the patient was afebrile. The drug was continued for eight days making a further dosage of 34 grammes. At this stage the clinical signs had improved considerably—breath sounds were audible and reduction in added sounds; sputum diminished in amount. Chest X-ray showed resolution of patchy consolidation in the left base and in the right mid-zone. A bout of diarrhœa then occurred: the stools yielded negative results; the patient responded to routine treatment. The patient now continued afebrile.

Period of Apyrexia: (sixth week—onwards).—Clinically the chest was clear. A second X-ray was not deemed necessary particularly in view of the short supply. In the abdomen the spleen was no longer palpable. Physically, the patient felt stronger and had obviously gained in weight (scales not available). The finding of a rising eosinophil count led to regular estimations and the genesis of the "eosinophil curve" is recorded graphically (Chart I). In the course of a search for "focal sepsis," the dental condition was found productive and the patient sent to the Dental Officer who reported as follows: "Local chronic periodontitis due to traumatic occlusion and absence of both lower central incisors. These teeth

will be progressively extruded so are best left to do so rather than extract. I have scaled tartar and applied 10 per cent chromic acid." It is of interest that in certain East African tribes in Tanganyika, Uganda and Kenya the permanent lower incisors are removed by the parents at or just prior to puberty, that is, after the second dentition for the lower central and lateral incisors—that for the central incisors being at the age of 7 [3].

When only the central incisors are removed occlusion may result—as in this instance (see sketch); when central and lateral incisors are extracted a permanent gap persists. Unaware of these tribal customs the Dental Officer thought the missing teeth were unerupted.



Sketch of Dental Formula.—(A) Receding gingival line with pockets of pus; (B) Exposed incisor root; (C) Absent central incisors.

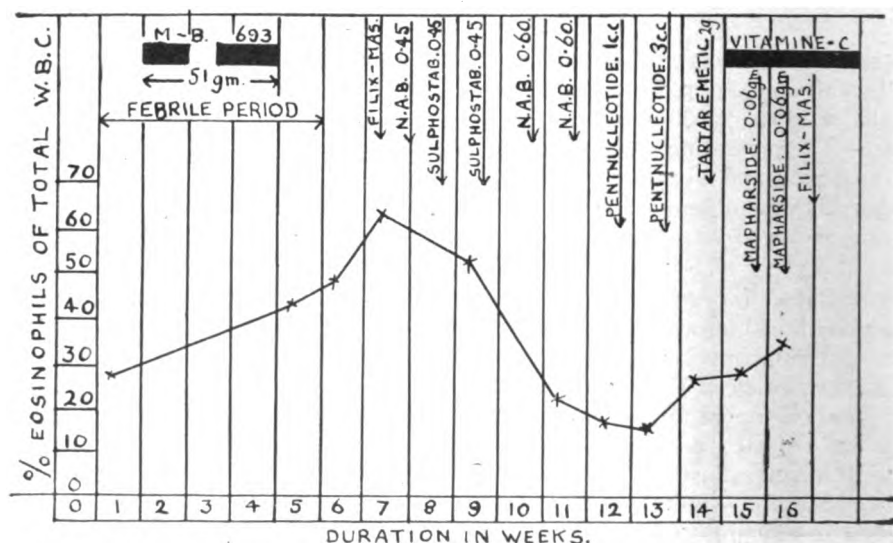


CHART I.—Circulating eosinophils in the peripheral blood-stream.

Treatment of the Eosinophilia.—Included arsenotherapy (substituted by antimony tartar emetic on one occasion when an arsenic preparation was not available), courses of Filix mas (to observe the effect on intestinal helminths, present—it was thought—but undetected), and ascorbic acid 150 mg. daily. Arsenical preparations used included N.A.B. 0.45 gramme and 0.6 gramme intravenously; "sulphostab" 0.45 gramme intramuscularly; and "mapharsen" 0.06 gramme given intravenously.

After five injections of arsenicals, the eosinophil count had fallen to 17 per cent of the total W.B. count. At this stage two intramuscular injections of "pentnucleotide," 1 c.c. and 3 c.c., were given to observe the effect on the eosinophil/neutrophil ratio (see Chart I).

Points Noted.—(1) The failure of sulphapyridine to affect the rising eosinophil tide during the acute febrile stage (see Chart I). (2) The initial specificity of arsenotherapy and in

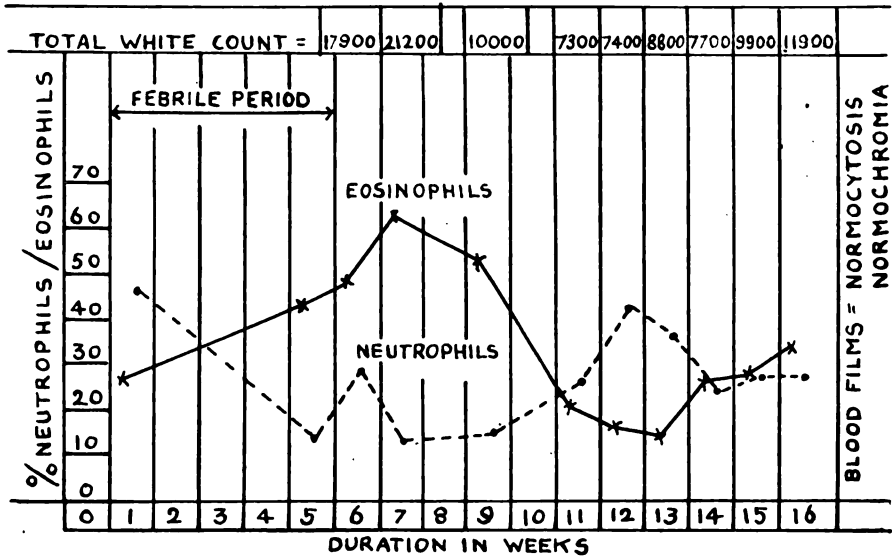
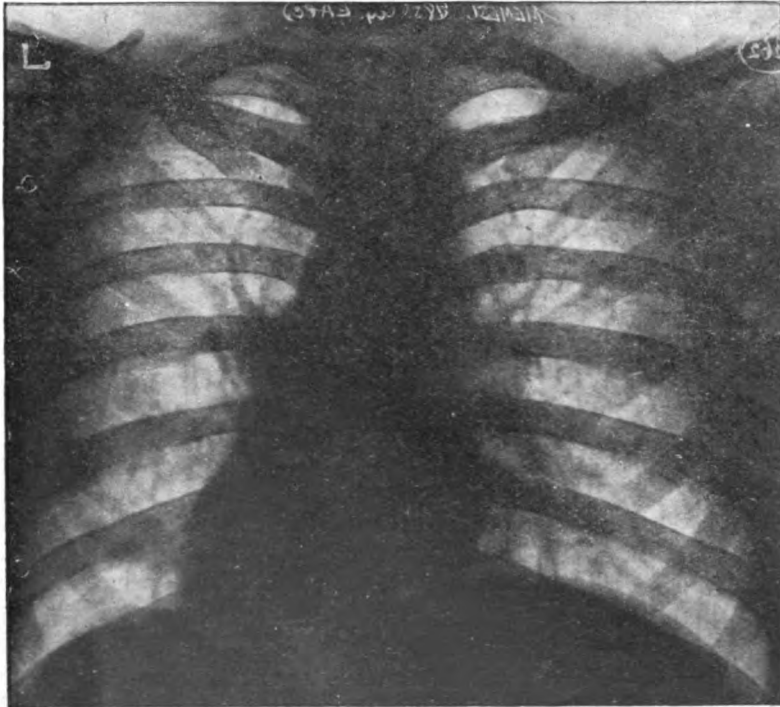


CHART II:—Comparison of neutrophil-eosinophil level.



X-ray of Chest.

particular N.A.B.—it was regretted that further supplies of this preparation were not available for a complete assay. (3) The greater eosinophil response to pentnucleotide. It was noted

that the eosinophil level rose while the neutrophil fell ; this effect was not immediately checked by the exhibition of two further injections of mapharsen. (4) The eosinophilia in the febrile stage is accompanied by a neutropenia ; when the eosinophil level declined the neutrophil climbed (see Chart II).

Discharge to Unit.—At the end of sixteen weeks the patient was returned to unit. There was marked increase of weight, abatement of symptoms of cough and weakness ; the patient felt quite fit for his military duties. The blood picture of leucocytes was reflected as shown: Total white count = 11,900, with eosinophilia = 36 per cent and neutropenia = 29 per cent.

INVESTIGATIONS.

Blood Film.—Initially, during rises of temperature, routine blood slides were taken for malarial parasites with negative results.

Blood slides for microfilariae were not included in our investigations in view of the uniformly negative results achieved by Weingarten who made quite extensive searches for these organisms in diurnal/nocturnal blood films, in the sputum, urine and fæces of his cases.

Chest X-ray.—Here included (see p. 179), shows a picture consistent with bronchopneumonic consolidation.

Sputa Tests.—Five consecutive sputa tests were negative for the *M. tuberculosis*.

B.S.R.—Apparatus was deficient to implement this investigation.

Blood Counts.—Recorded graphically on Chart II.

Urine.—Yielded a trace of albumin, nil in the deposit ; the albumin disappeared in later specimens.

Stools.—Concentrated specimens were repeatedly examined for helminths with nil result.

Sternal Puncture.—Findings are tabulated below (ninth week) :—

Cellular types				Per cent	Normal range
Neutrophils	..	..	..	24	20-50
..	Metamyelocytes	..	..	7.5	2-10
..	Myelocytes	..	..	2	2-12
Eosinophils	..	..	..	7	0-4
..	Metamyelocytes	..	..	3	0-1
..	Myelocytes	..	..	2.5	0-1
Premyelocytes	..	..	..	1	1-8
Myeloblasts	..	..	..	1	0-3
Lymphocytes	..	..	..	14.5	2-24
Monocytes	..	..	..	4.5	0-7
Normoblasts	..	..	..	26	5-20
Late Erythroblasts	..	..	..	5	? 0-5
Early Erythroblasts	..	..	..	1	?
Megaloblasts	..	..	..	1	0-3

Total nucleated cells = 198,000, c.mm.

Myeloid Red cell ratio = 1.4 : 1.

The Pathologist reported as follows : " No significant deviation from normal eosinophilia. No evidence of an eosinophilic aleukæmia."

Kahn Blood Test.—I regret not having submitted a blood Kahn in the early stages in view of the treatment of the condition by arsenotherapy. There was nothing in the clinical findings to indicate this test at the outset ; later, after N.A.B. had been given, the value of the test was vitiated.

DISCUSSION.

Differential Diagnosis.—Before establishing this diagnosis, the more commonly occurring diseases were excluded in addition to the following :—

(a) Pulmonary tuberculosis, which was simulated by wasting, evening rises of temperature, cough and sputum ; against this diagnosis were the rapid physical and clinical improvement, the negative sputa and X-rays, the characteristic rising eosinophil count, with coexisting depression of the neutrophil count and the absence of tachycardia and clubbing of the nails.

(b) Eosinophil leukæmia was a possible diagnosis in view of the blood count and early splenomegaly; the sternal puncture was an essential diagnostic aid.

(c) Asthma cum helminths: the early bronchial symptoms of somewhat explosive nature suggested the tentative diagnosis of bronchial asthma which is associated with a raised eosinophil count during periods of attacks: in Africans, the combination of bronchial asthma with helminth infection would account for a higher eosinophil count. Neither of these postulates was established. It is patent that in dealing with indigenous populations exposed to helminth infections of diverse forms at an early age the possibility of a concomitant helminth infection must be borne in mind. I incline to the view that, in African subjects, eosinophilia 10 to 12 per cent of the total white count represents a normal deviation as compared with the figure of 1 to 4 per cent in European patients.

(d) Other conditions with a raised eosinophil count include infestation with *ankylostoma*, *dracunculus*, *clonorchis* (5 to 10 per cent); *filaria* and *paragonomiasis* (10 to 20 per cent); *Loa loa* (up to 60 per cent); *bilharzia* and *trichinosis* (20 to 60 per cent) [4]. These conditions do not present the other clinical features seen in tropical eosinophilia.

(e) "Ascaris pneumonia," in which an atypical pneumonia occurs due to infestation with the ascaris and accompanied by a raised eosinophil count, required exclusion. I have seen such cases of sulphapyridine-resistant pneumonia in Africans which cleared up completely after the exhibition of the appropriate anthelmintic. Manson-Bahr makes the following interesting notes on this condition: "Although ascaris pneumonia is not often diagnosed in man its presence has been suspected in West African negroes. In experimental animals heavily infected with ascaris larvæ, death takes place from pneumonia after four to five days. The larvæ, in their wanderings through the lung capillaries, must give rise to considerable disturbances. . . . The experiment of Koino, a Japanese investigator, must be mentioned. He swallowed 2,000 ripe human ascaris eggs. Six days later he was attacked by a definite pneumonia with dyspnoea, cyanosis, a pyrexia of 104° F. and a fever which lasted seven days. The sputum was profuse from the eleventh to sixteenth day and contained ascaris larvæ, of which 202 were counted. The liver was enlarged and there was congestion of the conjunctivæ. Ascaris infection is usually associated with an eosinophilia but this is by no means so reliable as was formerly considered. . . . During the invasion stage, when the larvæ are resident in the lungs, there is a very definite eosinophilia but this diminishes as the worms enter the intestinal canal" [5].

(f) Yet another rare possibility was that condition described by Loeffler [6], in which radiographic pulmonary infiltration was accompanied by moderate leucocytosis and eosinophilia clinically; there was little disturbance of the physical health.

Ætiology.—(1) Predisposing causes:—

(a) Nutritional factors. May become operative if coexistent with other ætiological factors hitherto unknown. It has been observed that many natives of Africa and/or India are or were suffering from diseases due to vitamin-lack, e.g. beri-beri, pellagra, osteomalacia. Others were border-line subclinical cases, not displaying the florid clinical picture. In the Army, however, these deficiencies are not likely to arise.

(b) Allergy might play some part in the causation of this condition but there is not sufficient evidence to invoke it.

(c) Endocrine imbalance as a factor appears to be too hypothetical.

(d) Hereditary familial characteristic.

(2) Exciting causes:—

(a) Infection. The disclosure of a septic focus in the dental condition may be significant, particularly as African subjects are generally free from dental sepsis by virtue of their habit of post-prandial dental toilet with a special "green-stick."

Septic foci in the tonsils, gall-bladder or appendix in Africans are also rare; the prostatic crypts as a nidus of infection (due to previous urethritis) can be dismissed on the grounds of rarity in this disease of tropical eosinophilia—relatively speaking—compared with the recent frequency of urethro-prostatitis.

(b) Disturbance of metabolism. Whether such a factor could induce changes in the blood picture through the medium of the bone-marrow it is premature to decide, considering the little disturbance of the marrow as reflected by the sternal puncture findings.

CONCLUSIONS.

The condition known as tropical eosinophilia occurs in tropical and subtropical climates. It can prove incapacitating when the eosinophil count is rising accompanied by fever, weakness and pulmonary infection. The acute febrile episode can be controlled by the exhibition of arsenotherapy, after which the patient improves physically *pari passu* with a decline in the eosinophil count. The eosinophil count may rise later to a figure above normal without any deterioration of the physical condition of the subject. Whether the condition remains symptomless it is difficult to say without the help of follow-up case-records (always a tedious procedure with Service personnel).

SUMMARY.

The progress and course in an African subject presenting the clinical picture of cough, sputum, loss in weight and massive eosinophilia are here recorded. An infective ætiological basis superimposed on a familial history is put forward. Treatment with arsenicals is recorded graphically.

ACKNOWLEDGMENTS.

I wish to express my indebtedness to Major B. W. Lacey, R.A.M.C., Pathologist, for his interest and invaluable assistance which made these investigations possible ; to Captain B. Herson, A.D. Corps, for his advice on the dental aspect of the case; and to Serjeant D. Smith, R.A.M.C., for the sketch of the dental formula.

Also, I wish to acknowledge the kind assistance I received from Lieutenant-Colonel Everley Jones, R.A.M.C., O.C. a Med. Division, a General Hospital in the M.E., in writing this paper. My thanks are due to Sisters Kirtley and Judge, Q.A.I.M.N.S., R., for their nursing skill.

BIBLIOGRAPHY.

- [1] WEINGARTEN, "Tropical Eosinophilia," *Lancet*, 1943, **1**, 103.
- [2] LETHBY TIDY, "A Synopsis of Medicine," 1934, 658.
- [3] LEE MCGREGOR, "Synopsis of Surg. Anatomy," 1939, 449.
- [4] MANSON-BAHR, P., "Manson's Tropical Diseases," 1940, 1025.
- [5] *Ibid.*, 1940, 804.
- [6] FREUND, R., and SAMUELSON, S. *Arch. Int. Med.*, 1940, **66**, 1,215.

MEDICAL HISTORY OF AN ACTION.

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THE administration of an independent, highly mobile force always presents medical problems of a peculiarly difficult nature. When a force such as this has no lines of communication, is unable to evacuate its casualties, is forced on the defensive in unknown terrain and has to contend with an inadequate water supply and insanitary conditions, the burden thrown on its medical services becomes intensified a thousand-fold.

It is proposed to relate in the following account how a force confronted with an almost discouraging combination of the above-mentioned factors succeeded not only in evacuating a reasonably high percentage of its wounded but also in keeping up the morale and effective fighting strength of its troops to a high degree.

TACTICAL CONSIDERATIONS.

A mixed force of British, Gurkha and Indian troops, operating in a wild, mountainous tract on the Assam-Burma border, were ordered forward to intercept, delay and if possible divert the movements of a superior Japanese column which was advancing to attack an important base. The choice of a locale for a defensive action was limited in view of the unsuitable nature of the country, mountain and jungle, and in the unanticipated speed of the enemy's advance. The time factor made it necessary to choose as the final site a village on a small plateau, a position where the great disadvantage, the lack of water, was immediately made apparent. The officer commanding the force was aware of this but was assured by wireless communication from the base that the deficiency would be made up by an adequate supply of water dropped in parachute containers. The force had scarcely moved into position and had just commenced to dig in when strong Japanese patrols cut across the L.o.C. and the action began.

Our air superiority in this sector was complete and unchallenged and this enabled water, food, ammunition and medical stores to be brought in by parachute air supply.

It is interesting to give some account of the type of troops employed. These, in the main, were hand-picked, highly specialized and of a physique and fitness well above the average. They were accustomed to taking unusual risks and were fully prepared from the beginning of their training to fight in isolated positions behind the enemy lines. As a result of this the morale was uniformly good and the reliance which these troops placed in each other remarkably high.

MEDICAL PERSONNEL AND EQUIPMENT.

The total medical personnel at the disposal of the force consisted of sixty mixed British and Indian other ranks and seven medical officers, two of whom were R.M.O.s. In effect there were two sections and the skeleton H.Q. of a specialized light field ambulance with the addition of a surgical team consisting of a surgical specialist, anæsthetist and six other ranks. The equipment was of a type suited to the requirements of such a mission and all the essential materials could be carried in man-packs with the aid of Everest carriers. Concessions to additional bulk in the form of mule-packs were made for extra supplies of Cellon plaster, blood plasma and glucose-saline and a collapsible operating table of the air-borne pattern.

MEDICAL ARRANGEMENTS.

The area to be defended, termed a "box," had a perimeter a mile long and this did not enclose any of the local water points. From the first it was understood that water had to be

carefully rationed and a reserve was set aside for the use of the surgical team and the needs of the M.D.S.

Shallow latrines were dug on the perimeter and the proper use of these strictly enforced.

As far as was compatible with fighting efficiency, anti-malarial precautions were taken, but the high situation of the box and the extremes of temperature markedly diminished the risks of malaria. Chlorination of the available water was done in bulk and in small quantities by the use of water-sterilizing outfits. Later on the air supply of fresh water made this precaution unnecessary. The diet was adequate in bulk and was made up of tinned food-stuffs and parachute-type rations. Fresh meat and vegetables were unprocurable but there was a plentiful supply of vitamin tablets. When all these conditions had been appreciated a disposition was made of the medical resources for the reception and treatment of battle casualties.

Four R.A.P.s were located at strategical points just within the perimeter and the rest of the medical personnel was used for bearing and at the central dressing station, which comprised a large reception area, an operating theatre and deep trenches for the protection of the wounded. The immediate requirements were protection from bullets and shrapnel fragments, which came profusely and indiscriminately from all directions inside and outside the perimeter, and shelter from the torrential rain which threatened to wash out all the most strenuous efforts of the ambulance sepoy at trench-digging. The most important task, an operating theatre, was dug out of the mud, a pit some 8 feet square and 5 feet in depth. It was buttressed by sand-bags and cushions from the ends of parachute containers. The roof was constructed of bamboo, tarpaulins and earth and the walls were lined with dark coloured parachute silk in order that lights could be used for night work. This was all done under heavy enemy fire whilst the number of severe casualties awaiting operation was gradually mounting.

MEDICAL ADMISSIONS.

At the beginning of the action, medical admissions were very few and consisted mostly of cases of simple diarrhoea and of fever of two days' duration responding satisfactorily to rest, fluid diet and antipyretics. Few of the troops had been on suppressive mepacrine but there was no undue evidence of malaria. There were two cases of ascariasis and these received carbon-tetrachloride. Gastro-enteritis and dyspepsias were not uncommon but these could be attributed to diet and other known factors and were easily cured.

BATTLE CASUALTIES.

All of the wounded within the perimeter were admitted to the central dressing station and an immediate attempt was made to assess the degree of priority for resuscitation and operation. The majority of wounds were caused by small calibre bullets (0.256 inch) from rifles and automatic weapons and cast-iron grenade fragments and shrapnel from H.E. shells (75 mm.), and also bomb fragments from 2 inch and 3 inch mortars. There were very few cases of bayonet or sword wounds. In spite of the fact that few of the troops wore steel helmets, preferring either Gurkha felt hats of double thickness or cap comforters, there was a surprisingly small percentage (approx. 5 per cent) of head wounds and these, when they did occur, were located generally below the protection line of the steel helmet, British pattern.

Approximately 60 per cent of the total number of the wounds inflicted were in the upper limbs, chest and throat and the remainder of the injuries were confined to the lower limbs. Of the casualties brought in only two had sustained perforating wounds of the abdomen and both these exhibited a severe degree of traumatic shock.

The treatment of all these cases was based on the principle of as little surgical interference as possible, for the unsuitable circumstances made it essential to treat first and foremost the shock and to get the patients into a position of comparative protection from a blanket of fire which covered the dressing station and its approaches. Twenty major surgical operations were performed either to arrest excessive hamorrhage, to explore wounds which endangered life or to immobilize compound fractures of the limbs with severe destruction of tissues.

Most of these were safely evacuated and showed satisfactory progress. The anæsthetic used in all cases was intravenous pentothal sodium for rapid induction followed by chloroform. This procedure, as has been demonstrated before on active service, proved to be efficient and produced no noticeably marked after-effects.

The comparatively small number of operations was due to the fact that, at all times, everything conspired to make the task of the surgeon difficult. Rain flooded the operating dug-out and washed instrument sterilizers and dressings into a mire of tenacious mud. Bomb fragments piercing the walls of the dug-out made any but a crouching or sitting position dangerous. Light was available from electric torches, head lamps and hurricane lamps and at night only life-saving operations were attempted. The insufficient supplies of water reduced scrubbing-up and sterilization to a minimum and at one time the surgeon was forced to wash up in a mixture of Mist. Expect. Stim. and Mist. Kaolin Co.

In general, the treatment of the less severe wounds was limited to débridement, the extraction of fragments, packing with sulphanilamide powder and sterile vaseline gauze and immobilization with Kramer splinting and Cellona plaster.

One unwelcome discovery was the presence of phosphorus burns due to Japanese shells. These were extremely painful and, as there was only a negligible amount of copper sulphate in the stores, recourse had to be made to any forms of alkali available. This treatment appeared to give some comfort and allayed the pain and the concomitant anxiety.

The outstanding therapeutic success of the whole action was the invaluable and often dramatic use of blood plasma and glucose saline. Only small stores of these were carried forward and these were further decreased by loss and enemy action. A total of eighteen pints of blood plasma and six pints of glucose saline was used with the maximum of effect. The criteria for their use were severe hæmorrhage, the probable prognosis of the patient and the value of any particular man to his unit. The excellence of the giving-sets lay in that the whole apparatus could be easily and swiftly set up under the worst of conditions, with no other aid except a bamboo pole stuck in the ground to suspend the bottle of fluid. And, indeed, intravenous fluids were given in slit trenches under heavy fire and in the open at night with only the faintest glimmer of light from a shaded torch. The value of such treatment may be assessed from the record of two officers who, originally wounded severely in the face and throat with great loss of blood, were after transfusion and rest able to recover sufficiently to perform noteworthy acts of endurance and heroism.

PROGRESS OF THE ACTION.

On the sixth day of the battle a survey was taken of the tactical situation. Each day the enemy was receiving strong reinforcements and was mounting a heavier offensive. It was apparent that the perimeter would have to be shortened. The increasing number of casualties was taxing all the resources of the Field Ambulance as it was becoming harder to find any accommodation for the wounded who were already packing the trenches. A breach in the outer perimeter had imperilled the safety of the dressing station and it was necessary to remove all the wounded to a slightly more protected position on the further slope of the hill and to find a new operating theatre. Morale was still high but the sight of the wounded lying unprotected over the area of the inner defences was bound to have a depressing effect on the remaining combatants and the thickening up of the troops on the ground made the possibility of injury from shrapnel more likely. Water as usual was a problem and, on the last day, some of the wounded were given glucose saline to drink. This was not unpalatable.

The area of the box was becoming too small to ensure that adequate supplies could be dropped from the air and one was forced to see medical stores and food being dropped well behind the enemy lines.

The object of the force had been satisfactorily accomplished and, on the evening of the sixth day it was decided to disengage the enemy, evacuate the wounded and withdraw in good fighting formation from a position which had become untenable. The S.M.O. was given two hours in which to prepare the casualties for an arduous trek across country, involving

a journey of at least 40 miles and hand-carriage for stretcher cases through jungle, along river valleys and over narrow, steep mountain passes.

It was at this juncture that the S.M.O. had to make his most critical decisions. It was to be reasonably assumed from previous experience and from the knowledge that their own L.o.C. were being threatened that the Japanese would waste no undue consideration on the wounded or respect the Red Cross. It was also appreciated that each man of our force was a specialist who had received a long and expensive training and that his loss to his unit as a P.O.W. would be irreplaceable. Therefore it was decided to evacuate as many of the wounded as could be got away. The walking wounded could move, however slowly, steadily forward under a protective screen of fit troops. With the stretcher cases the implications were more serious. It was obvious that not all of them could be evacuated because the number of bearers required would seriously reduce and impair the fighting strength of the column. Some of the cases were so badly wounded that it was certain they would not survive the hardships the journey entailed. The S.M.O., then, had to consider each case carefully casting aside all personal considerations. Would the man survive the journey? What was his probable prognosis and future ability as a combatant? Was he a key-man and essential to the future reorganization of his unit?

These decisions were all rapidly made, six bearers assigned to each stretcher case and, after certain medical arrangements had been made for the wounded who were remaining, these were left as comfortable as circumstances permitted. The rest of the equipment was destroyed. The small stores of food and water were distributed and, in the late hours of the sixth evening, the long line of wounded and its escort passed out through the perimeter under a covering fire from mountain guns and mortars and successfully negotiated the weakest part of the enemy's surrounding lines.

ADDITIONAL MEDICAL NOTE ON WAR HYSTERIA.-

During the period in the box there had been very few cases reporting sick and it is interesting to record that there were only two well substantiated incidents of war hysteria, one of hysterical aphonia and deafness and the other of extreme apathy, both occurring in auxiliary troops. The remarkable freedom from any of these hysterical conditions in a situation likely to produce them may probably be attributed to the initial training and good morale of the troops, and to the general appreciation from the beginning that under no circumstances could there be any evacuation from a precarious position, a predicament common to all. Both these cases, together with three others, who were brought in shocked and complaining of being struck by lightning in a tropical storm, were able to be returned to their units after rest and suitable psychotherapy.

MEDICAL ASPECTS OF THE ESCAPE PERIOD.

The column leaving the box was confronted with many grave problems. There was at all times the probability of Japanese ambush and the necessity for evading the enemy made it advisable to split up into small parties, each containing its quota of wounded. Heavy personal equipment was discarded, together with blankets and ground-sheets, and only weapons, water-bottles, food and ammunition were carried. The march was made on a rough compass bearing without any exact knowledge of the speed of the enemy's progress along the main roads. This meant travelling across country over a distance of at least 40 miles, a journey which was extended in the case of some parties of wounded to 75 miles. Where water was plentiful in the river valleys, there was the likelihood of enemy ambush; where food was procurable in the jungle and villages, the Japanese fired the surrounding areas and attempted to cover the avenues of escape.

Diet varied from dry biscuits, roots, flower petals, yams and rice to fresh peas, sugar cane, bananas and roast wild pig. In the beginning, most of the men suffered from lack of sleep, dehydration and accumulated nervous strain. To the wounded this period was an ordeal

where the discomfort, sultry heat, pain and thirst could only be counteracted by an overwhelming determination to get back to the Base.

The force reassembled at the Base after isolated parties had taken four to ten days to complete the journey and it was found that nearly all of these troops, wounded and fit, who had originally left the box had arrived safe and well.

LESSONS LEARNT.

The experiences of this action brought out certain points which it may be useful to recapitulate in view of future missions of this nature.

(1) Elaborate medical equipment is unnecessary. Everything that is needed should be capable of being carried in man-packs, with the help of Everest carriers. Light collapsible stretchers of the airborne type were found to be unsuitable for heavy work but carrying sheets materially proved their worth where ordinary Service stretchers were few or could not be used.

(2) As many tarpaulins as can be conveniently carried should be included in the equipment. These serve many useful purposes, but were chiefly employed in erecting temporary shelters for the wounded.

(3) The bulk of the medical stores carried should be made up of previously prepared sterile dressings, sulphonilamide powder, Cellona plaster, Kramer splinting, tubonic ampoules of morphia, Elastoplast and adhesive plaster and, if possible, occlusive dressings.

(4) Plasma and glucose-saline were absolutely invaluable and were easy to give. The extra weight and bulk were more than compensated for by the dramatic results achieved from their use.

(5) Efficient lighting is essential, and an increased issue of electric batteries is needed. Headlamps worked very well but limited the effective area of surgical operation, where no other light was available.

(6) During the escape period, it was effectively brought to notice that emergency packs should be prepared for such eventualities.

Suggestions for such a pack would have as a basis an extra water-bottle, iron rations or compressed fruits such as dates and raisins, rations of the American "K" type, chocolate, glucose "D" or barley sugar, an extra supply of water-sterilizing tablets, and fruit-drops or chewing-gum. As an added stimulant, benzedrine tablets would be useful where just that extra incentive is needed to overcome the exhaustion of a prolonged forced march.

CONCLUSION.

It would be impracticable to describe in full all the medical aspects of the foregoing action, but there are certain conclusions to be drawn. Firstly, the powers of recuperation of a wounded soldier can never be over-estimated and, secondly, that the most skilled surgical treatment is only a minor factor compared with the will of the patient to survive.

The endurance, the persistence of the offensive spirit, the boundless courage of the wounded will find wider publicity in official citations and journals, but it is gratifying to know that the expression of these qualities in some of the cases was only made possible by the prompt and effective use of plasma and sulphanilamide.

STEAM FLY INFESTATION¹

BY MAJOR J. B. MORWOOD,

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THE steam fly or German cockroach (*Blatella germanica*) is commonly found in N.A.A.F.I.s or other heated buildings where it can gain access to human food. A permanent high temperature appears to be necessary for its existence as it is not found as a rule in cookhouses where the fire is allowed to go out at night. It is about half the size of the common cockroach. Both the male and the female have fully developed wings, but the female is broader and more squat than the male. It is golden brown in colour, about half an inch long with long antennæ, and the wing cases are light brown. It is stated to have been introduced into this country from Asia a long time ago. This theory, however, does not satisfactorily account for the presence of steam flies in widely separated N.A.A.F.I.s.

SOURCE OF INFESTATION.

Cargo ships and even the galleys of passenger ships are frequently infested with steam flies, especially in the region of the steam and hot-water pipes. In some ships their presence is encouraged as they prey on bugs and will keep the ship bug-free. They are greatly preferable to bugs if a choice has to be made as they do not cause any discomfort.

In some ships their presence is not wanted and steps are taken to get rid of them. Fumigation with hydrocyanic acid gas which is carried out periodically to kill rats seems to kill most of the steam flies but in a short time they reappear and become as numerous as ever. Insecticide powders are also used with varying degrees of success.

It seems likely therefore that the steam flies are conveyed to the N.A.A.F.I.s in food which has been carried in a ship infested with steam flies.

HABITS OF THE STEAM FLY.

It lives in permanently heated cookhouses or kitchens around the hot water pipes, in drawers, behind tables and cupboards and on the under surface of tables, especially if these are not periodically cleaned. Although the above are its favourite living quarters it will live anywhere in the heated room and, at one location, so many were living in a clock that they stopped it.

Steam flies are not much in evidence during the day, especially if the infested room is kept very clean but, at night, the floor, shelves and tables will be seen swarming with them as they look for food. It is at night that the degree of infestation is best judged. Infestation is usually found to be heavy unless the kitchen is kept exceptionally clean.

In N.A.A.F.I.s it is the kitchen which is chiefly affected. The bar, food stores and pantries are less affected, while the dining rooms, rest rooms, bedrooms, etc., are either not infested at all or only have one or two steam flies which have come in from the kitchen.

LIFE CYCLE.

A fortnight after the final moult, when the insects have reached maturity, pairing takes place and a week later oviposition begins. The eggs are laid in a capsule, the average capsule containing forty eggs. This capsule is carried protruding from the tip of the abdomen of the female for about fifteen days. It is not dropped until the young are ready to hatch out. When the eggs are ready to hatch the larvæ appear head foremost. The larvæ are white at

¹Pyrethrum is in very short supply and its use in the manner suggested cannot be justified. It is probable that both methods will be superseded by D.D.T.—Ed.

first but in three hours the body with the exception of the thorax becomes black. This larva moults several times, becomes a nymph and finally an adult in about three to six months.

DISINFESTATION.

There is great variety in the methods used to combat steam flies and, judging by the number of N.A.A.F.I.s still infested, most of these methods would appear to be either ineffective or only temporarily effective. For example, spraying with various fluid insecticides is ineffective as only those steam flies actually sprayed are affected and many of these recover as the fluid evaporates. Cockroach traps are not of much value as the number caught is extremely small compared with the total number.

Poisoning is more effective than the above methods but is not much use alone. It may, however, be profitably used after the N.A.A.F.I. has been disinfested by either of the two main methods.

By far the most effective methods are: (1) Fumigation with Cimex candles; (ii) the Pyrethrum Powder Method.

(i) *Fumigation with Cimex Candles*.—Cimex candles are comparatively cheap and easily obtained from the Officer i/c Barracks. Unfortunately if this method alone is relied on the results are very disappointing. Experience has shown, even if every room in the infested building is treated at the same time as the kitchen, all the woodwork being stripped from the walls and the greatest care being taken to seal up ventilators and cracks around windows and doors, that steam flies have reappeared in two weeks in moderate numbers. Most of these are the small black larvæ of the steam fly, but a fair proportion of fully grown ones will be present also. The explanation of the presence of the larvæ is that the sulphur dioxide liberated by the burning Cimex candles does not kill the eggs which are protected by the egg capsules. Also, one or two adults are often seen the day after the fumigation indicating that 100 per cent kill has not been obtained. This is not due to any lack of penetration of the sulphur dioxide as it diffuses into the finest cracks and just as good results are obtained when the woodwork is left alone as when it is stripped from the walls. The efficiency of diffusion of the sulphur dioxide can be judged from the fact that it can be seen passing out through the smallest faults in the brickwork of the outside cavity walls of the N.A.A.F.I. when fumigation is in progress. It is difficult to account for the presence of these fully grown steam flies two weeks after fumigation. It is possible that the nymph, hidden away in a crack just before its final moult, is especially resistant to sulphur dioxide. In any case two weeks is long enough to allow eggs to hatch and any insect which may possibly have been in a resistant phase to grow out of this stage.

Taking the above practical points into consideration, and if Cimex alone has to be relied on, the following is the method of choice.

(1) When the N.A.A.F.I. closes in the evening all food, silver plate, cutlery and portable bright metal objects should be removed from the kitchen, wash-up room, pantries and boiler room.

(2) The directions given in each box of Cimex should be complied with though stripping of the woodwork is not necessary as just as good a result is obtained in the case of steam flies if the woodwork is left alone. This is a point of considerable importance as the N.A.A.F.I. staff will more readily agree to fumigation if the N.A.A.F.I. is interfered with as little as possible. Sealing of the premises is of the greatest importance. Sealing paper is a barracks issue.

(3) Only the rooms affected should be fumigated. These rooms usually are the kitchen, wash-up room, food stores, boiler room and the manageress's office if it opens off the kitchen. The bar occasionally is infested. A respirator should be carried when lighting the Cimex candles in case the concentration of sulphur dioxide becomes too high for comfort before all candles are lit.

(4) The N.A.A.F.I. is opened up next morning, the dead steam flies swept up and the day's work can commence.

(5) After fourteen days the above procedure is repeated with the following exception. When the N.A.A.F.I. is opened up the morning after the fumigation all drawers and tables should be scrubbed, paying special attention to the under surfaces and anywhere else eggs are likely to be.

The above treatment will render the N.A.A.F.I. comparatively or completely free from steam flies for quite a long period but, sooner or later, disinfestation will be required again.

(ii) *The Pyrethrum Powder Method.*—This method is very satisfactory to use and the results are more permanent. Unfortunately pyrethrum powder is hard to get and is expensive but, with regard to its expense, due consideration must be given to the fact that an expensive method which is effective may be more economical than a series of ineffective cheaper methods. It also is obtained from the Officer i/c Barracks. Five pounds is sufficient to disinfest a large kitchen. Mixtures of pyrethrum with other substances have been recommended by various authorities—for example a mixture of pyrethrum and sodium fluoride. It is found in practice, however, that this mixture is not nearly as effective as the pyrethrum alone. This is not surprising as the pyrethrum is a contact poison and would keep the steam flies from eating the sodium fluoride mixed with it. Hence the only effect of the sodium fluoride is to dilute the pyrethrum and reduce its efficiency.

The pyrethrum powder should be used with a dust gun. The dust gun issued for use with Paris green is ideal for the purpose. The details of the method are as follows :—

(1) While the N.A.A.F.I. is closed during the afternoon all food is removed from the kitchen and food stores, all drawers removed and laid on their sides on the floor and all the tables turned upside down. If the hot water or steam pipes are boxed in one board should be removed from the whole length of this hot water wooden casing to ensure that a good deal of the powder will settle inside it and on the piping. No other stripping of woodwork is required or desirable.

(2) A respirator is put on, the dust gun filled with powder and strapped on the operator and the kitchen is systematically dusted, the windows having been previously closed. The procedure is to commence at one corner, directing the dust at the wall, and to work slowly around the cookhouse, paying special attention to getting the dust into cracks, behind cupboards, around door fixings and up under the under-surface of sinks and drain boards. In addition the whole length of steam and hot water piping should be dusted.

The boiler room is treated in the same way as the kitchen.

In the case of the food stores and other rooms opening off the kitchen it is only necessary to dust the wall and door frame on the kitchen side.

Immediately the dusting starts hundreds of steam flies appear, apparently from nowhere, and run around in a dazed condition. As the dusting proceeds they fall down from the walls and even the ceiling. The effect is certainly spectacular. When they fall on the floor they find it covered with a fine coating of pyrethrum dust and they die in about fifteen minutes.

(3) When the dusting is finished the boards, which have been removed from the hot water pipe casing, are replaced but the powder and dead insects are not swept up for at least one hour, preferably two, afterwards. When this is done, only the dead insects and the powder lying in those parts of the kitchen which are being used should be swept up. That is, powder should be left lying at the foot of the walls overnight and should be allowed to lie in the inaccessible places behind boilers, cupboards, etc., for as long as possible. It should also be allowed to adhere to walls and the under surfaces of tables for as long as possible and it should not be removed from drawers and cupboards which are not normally used. The powder is quite inoffensive and harmless.

The great advantage that pyrethrum has over sulphur dioxide is that it remains in cracks where the eggs are and, as the eggs hatch, the emerging steam fly is killed at once. Also disinfestation can be carried out in one afternoon and the work of the N.A.A.F.I. is hardly interfered with at all.

If sufficient pyrethrum cannot be obtained to carry out the above procedure or if it has

to be bought in small quantities through N.A.A.F.I. a combination of the two methods may be used.

The N.A.A.F.I. is first disinfested with Cimex candles and afterwards pyrethrum is blown in small quantities through paper funnels into the cracks and spaces where the steam flies were known to be numerous. If this blowing of pyrethrum into the favourite living places of the steam flies is persisted in a satisfactory result will be maintained.

POISONING.

If no pyrethrum powder is available poison may be laid after fumigation with Cimex. Poison alone will not make an appreciable difference in a well-established infestation. The poisons which have been recommended are sodium fluoride mixed with an equal volume of flour or powdered rice, powdered borax mixed with chocolate or sugar or plaster of Paris (one part) mixed with sugar (two parts). Poison should be laid in out of the way corners and behind cupboards and boilers. It should not be laid on shelves or put in drawers as it might become mixed up with food.

SUMMARY.

An account is given of the life cycle and habits of the steam fly, and the difficulty in getting rid of this pest is pointed out.

The two most effective methods of disinfestation are described in detail. These are fumigation with Cimex candles and the pyrethrum powder method.

The pyrethrum powder method is considered the better of the two.

REFERENCE.

LAING, F. (1938). British Museum (Natural History), Economic Series, No. 12, p. 14.

Editorial.

ARMY ANÆSTHESIA.

IN the period between the two great wars of this century anæsthesia has made many advances which have been employed to the full in this war, with corresponding benefit to the war-wounded and to the surgeon. In fact, much surgery that would not have been undertaken without great trepidation, if it had been attempted at all, in the 1914-1918 war, is now performed with confident hopes of success.

The most striking change has been the introduction of intravenous anæsthesia but, in spite of about ten years' pre-war experience of the method, it was not until this war began that its wide applicability and usefulness were fully realized. In 1939, anæsthetists turning to problems of war surgery had their minds full of experiences in civilian life and methods for use in the field were discussed in the light of these experiences. Certainly, between the wars, there was a wider experience of traumatic surgery than was general before the 1914-1918 war, because of the large and constant flow of casualties from road accidents which poured into every civilian hospital. But these were dealt with under leisured conditions, in operating theatres where equipment and assistance were plentiful and easily available, and where there was no problem of preparing recently-operated patients for early evacuation from hospital. In most respects, therefore, though anæsthetic practice in war has followed anticipated lines and has been based on well-recognized principles, yet, when we look back at some of the advice given at the beginning of the war, we realize sharply that we did not really appreciate the problems that would face us. Adaptation to conditions encountered was rapid, advice not born of experience was quickly discarded and anæsthetists soon settled down to what may fairly be described as "modern utility anæsthesia."

From the first, the importance of resuscitation of the injured was recognized. The inter-war experience of casualty surgery had created an awareness of this need. The Army Blood Transfusion Service deserves high praise for its splendid organization of supplies that have never failed and the way in which casualties now reach the theatre well resuscitated and ready for operation is a sheer delight to the surgical team and minimizes many of their problems. With very few exceptions, and generally only when active hæmorrhage is in progress and cannot be arrested without major surgical procedures, for example, where there is intra-abdominal hæmorrhage, is operation begun before resuscitation has produced recovery from severe shock. It is therefore almost incorrect to discuss anæsthesia for the shocked patient. It would seem better to discuss methods for the severely wounded patient, who presents quite a different problem from his lightly wounded comrade, because, although he has been resuscitated and although resuscitation continues during and after operation, shock is liable to recur as a result of anæsthesia and operation. Anæsthesia must be adjusted to suit the needs of each individual case.

In the 1914-1918 war the anæsthetic agents available were chloroform, ether and nitrous oxide. It was realized that chloroform alone was too toxic to be safe for the severely wounded patient; ether could provide satisfactory operating conditions, but it acquired an undeservedly bad reputation at this time, probably because it was frequently used injudiciously to provide unnecessarily deep anæsthesia; and therefore the ultimate conclusion of experts was that nitrous oxide with oxygen was the safest anæsthetic for the seriously wounded case. This conclusion was perhaps justified then but it came to be revised between the wars as knowledge of anæsthesia grew. Nitrous oxide is a difficult agent with which to provide satisfactory anæsthesia without anoxia for any except minor cases; certainly, if given

without anoxia it is a supremely safe anæsthetic, but then it cannot easily give satisfactory operating conditions for major surgery when muscular relaxation is required. We learnt that the range of usefulness of nitrous oxide could be increased by preliminary and/or simultaneous administration of pentothal or by judicious simultaneous administration of ether; that ether could be given in small dosage to produce much lighter anæsthesia than had previously been thought practicable; and that in these ways the patient could be assured of adequate oxygenation throughout anæsthesia—a very important point for the severely wounded patient where anoxia, which tends to increase shock, must be rigidly excluded. These lessons are now incorporated in everyday practice.

During the 1914-1918 war endotracheal anæsthesia began to be used more extensively than ever before and improved and simplified methods of intubation were introduced. Its use has continued to increase between the wars until now, for cases which require it, it is readily available since it is a basic part of the anæsthetist's technique. It is especially important in maxillo-facial wounds where usually surgery cannot be safely undertaken without it. Good supplies of endotracheal tubes and of laryngoscopes are now essential equipment for anæsthesia.

Experience in forward anæsthesia is well reviewed in the leading article in the *Lancet* for July 15, 1944 [1], and also in the Field Surgery Pocket Book of January, 1944 [2]. The former article points out that spinal anæsthesia has no place in forward surgery and also indicates the limited use that can be made of local anæsthesia—this, by the way, is an instance where conclusions from pre-war civilian hospital experience had to be revised under active service conditions; the extensive use of local anæsthesia was advocated by some writers, but experience near a battle front quickly showed that it had very little place at all there. From all quarters we hear that pentothal has been the main agent for four out of five cases in Field Surgical Units and in the *Lancet's* article an important warning is given that dosage must be reduced, and much reduced, in severely wounded patients. To give these patients doses that would be correct for them when in robust health is likely to produce fatalities. Lack of realization of this fundamental principle led to many deaths, reported by the Americans, among casualties from Pearl Harbour [3]. These deaths should not rightly be ascribed to pentothal, and by such avoidable errors a valuable drug can be wrongly discredited. Fortunately, wide experience with pentothal used wisely in this war has given this form of anæsthesia first place, not only in forward units but also in base hospitals. It is still often stated by those with little practical experience of intravenous anæsthesia that it must necessarily be dangerous, because "once you have put it in you can't get it out." To anæsthetists who understand the use of pentothal, this seems a curious view and, at best, a "hangover" from the early days of intravenous anæsthesia when it was considered as rather an adventurous method. Indeed, the same might be said of any potent drug. It is true that, with an inhalation anæsthetic, the patient to some extent limits his own overdose because, when he stops breathing, it is difficult (though not impossible) to give him more; with an intravenous anæsthetic, one can easily administer more than will cause respiratory arrest. The obvious answer is that the anæsthetist should not administer so large a dose that he would like to get it out—and that he should not employ *any* drug whose full action he does not understand. Anyone properly trained to use intravenous anæsthesia can employ it in severely wounded and robust patients alike, with safety and success, as this war has amply shown. The use of pentothal for minor surgery has the important advantage that patients quickly recover consciousness and with few or no after-effects so that they can soon be ready for evacuation. For abdominal cases, where muscular relaxation is essential, and for thoracic and maxillo-facial wounds, pentothal alone is not the anæsthetic of choice. Here, ether has shown itself of great value, given either with nitrous oxide and oxygen, from a Boyle's machine, or from the Oxford Vaporiser, a valuable apparatus with which ether-air mixtures of known composition can be given and with which it is easy to administer low concentrations of ether. These machines are both available to forward units. Cyclopropane is available to (most) chest surgery units

but not generally elsewhere in the Army. The Field Surgery Pocket Book makes a useful classification of cases for anæsthesia into :—

- (i) The lightly wounded.
- (ii) Those suffering from severe wounds with shock and hæmorrhage.
- (iii) Those suffering from severe sepsis, especially anaerobic infection.

Advice is given on anæsthesia for these types of cases, and also on anæsthesia for different operation sites, special instructions being given for anæsthesia for wounds of the head, for maxillo-facial wounds, for wounds of the chest, for abdominal wounds and for burns.

For the toilet of burns, it has been a surprise to find how much can be done, the patient feeling no discomfort when morphia alone is given intravenously in divided doses. The success of this method has really to be seen to be believed. Some workers even say that if the surgeon wishes to do more than can be done under morphia, then he is performing too vigorous a burn-toilet. This valuable method spares the patient with extensive burns a long anæsthesia which would tend to increase his shock and it frees the anæsthetist to deal with other cases. Intravenous administration of morphia and/or of atropine for premedication is gaining popularity. In the shocked patient a dose of morphia subcutaneously may have little effect because of slow absorption due to sluggish peripheral circulation. The dose may be repeated and still there may be no apparent effect, until resuscitation is under way, when the previously administered morphia may suddenly become absorbed and then sometimes proves to have been more than was really necessary. In shocked patients, therefore, where morphia can be given intravenously, this is the route of choice as it ensures immediate absorption, rapid relief from pain, and eliminates the danger of overdosage.

Anæsthesia in static hospitals is worthy of mention. Here, the difference between Army and civilian practice is chiefly that, in the former, one is dealing almost entirely with "tough" patients and these robust adults often considerably tax the anæsthetist's skill. The standard machine is the Boyle with carbon-dioxide absorber unit attached. Spinal anæsthetics, chiefly nupercaine (hyperbaric and hypobaric) and stovaine, are employed and local anæsthesia is often used, either alone or associated with general anæsthesia. Trilene (trichlor-ethylene) is available but should never be used in a closed circuit because dangerous decomposition products are formed during its passage through the soda-lime [4]. In any hospital ward, treatment is a favourite topic for discussion and the surgical patient in these days is a connoisseur of anæsthesia. It is worth noting that the soldier will usually vote for pentothal and often asks for this anæsthetic by name. If he knows he will get pentothal, he is not afraid of his visit to the theatre. He generally has a strong preference for being asleep during the operation, especially if he has recently been a battle casualty. In a static hospital, where spinal anæsthesia may often be used for herniotomy and for hæmorrhoidectomy, the anæsthetist soon learns what his patients think of it. It is not suitable for the highly nervous patient but, for the average patient, properly premedicated, is very satisfactory. If spinal puncture is performed easily, and if there are no headaches afterwards, this form of anæsthesia is often appreciated because of its lack of after-effects, but a patient in whom spinal puncture has been difficult or in whom anæsthesia has been followed by a severe headache soon spreads a warning and spinal anæsthesia will be regarded with suspicion, not without justification, for some weeks until confidence is again restored to the ward. In every Army hospital, where herniotomy is an everyday operation, the occurrence of post-operative "chests" is a constant problem. The method of anæsthesia has little, if any, influence on their incidence and it is generally found that this is most effectively reduced by rigid exclusion from operation of patients with an acute common cold, of those with prodromal signs of a cold, of recent convalescents from a cold and of those with chronic bronchitis. It is best to discharge these patients from hospital with instructions to return on recovery from infection. All cases should be given breathing exercises before and during convalescence from operation.

Anæsthetists are on the whole a mechanically ingenious race and modern apparatus does

require mechanical knowledge if it is to be used efficiently. The apparatus may look mysterious and impressive to the uninitiated but it is always the man behind the machine that counts and not the machine itself. Many a modern anæsthetist, reduced to the minimum of equipment in forward areas, has surprised his surgical colleagues by his capacity for improvisation which has enabled him still to provide elegant anæsthesia. "Modern utility anæsthesia" has stood the test of five years of war and it is really gratifying to the anæsthetists to know that their work is genuinely appreciated.

REFERENCES.

- [1] Leading Article (1944). *Lancet*, **2**, 81.
- [2] War Officer Publication (1944). "A Field Surgery Pocket Book," pp. 56-61.
- [3] HALFORD, F. J. (1943). *Anesthesiology*, **4**, 1, 67-69. ; Editorial (1943), *Ibid.*, **4**, 1, 74-77.
- [4] HUMPHREY, J. H., and McCLELLAND, M. (1944). *Brit. Med. J.*, **1**, 316-318.

Clinical and Other Notes.

A CASE OF PARAPLEGIA FOLLOWING ANTI-RABIC VACCINATION.

BY LIEUTENANT-COLONEL ALEX. H. IMRIE,

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NEUROLOGICAL complications following anti-rabic vaccination, though fortunately rare, are well recognized and when they occur, may be of a particularly distressing type as the following case illustrates.

History.—On December 10, 1942, an officer, aged 40, in excellent health and with no history of previous disease, while walking along a street in a Middle Eastern city, was bitten by an unidentified dog. Before disappearing in the crowd, the dog also bit several other people. The officer immediately went to the anti-rabic centre where he received fifteen daily injections, each of 10 c.c. of killed phenolized vaccine, the course being completed on December 26, 1942. Apart from considerable local discomfort at the site of injection he experienced no ill-effects. On December 30 he complained of what he regarded as rheumatic pains in the shins and in the lumbar region. They were not severe however and he returned to the desert.

On January 24, 1943, twenty-nine days after the last dose of vaccine, he felt out of sorts, was fevered and noticed some numbness in both legs, especially the left; he also had fairly severe pains in both legs and in the lumbar region. The legs rapidly became weak and he had difficulty in walking though he could stagger a few steps up to January 31. He also noticed a sensation of numbness around the anus and defaecation and micturition became increasingly difficult. There was a sense of constriction about the level of the xiphisternum and he felt, to quote his own words, as "though a cord were tied around his middle." He was admitted to hospital on February 6, 1943, when his condition was as follows:—

Condition on Admission.—A thin man of healthy appearance. The dog bite had completely healed. He lay flat on his back with legs extended and was unable to sit up in bed without assistance. He was perfectly alert mentally and the heart, lungs and urine were normal.

Examination of the cranial nerves, the arms and the upper part of the trunk revealed no abnormality. Breathing was not laboured. The abdominal muscles were very weak especially below the umbilicus and the abdominal reflexes were not elicited. All muscles of both legs showed gross though not absolute loss of power. All forms of sensation were greatly diminished, though not entirely absent, up to the level of the xiphisternum, the muscle-joint and vibration senses in the legs being most severely affected. The knee and ankle jerks were just elicited on both sides; the right plantar response was flexor, the left was equivocal. There was considerable difficulty in initiating micturition and the performance of the act was inefficient.

Lumbar puncture yielded a clear fluid under normal pressure. Cells 8 lymphocytes per c.mm., protein 60 mg. per cent, chlorides 780 mg. per cent; Kahn test negative.

Progress.—The dysuria increased and on February 9 complete retention occurred. Constipation was absolute. A low grade bronchopneumonia developed and his general condition deteriorated. Though consciousness was never lost he became stuporose and disorientated and later he stated that he remembered nothing of this period of his illness. Catheterization was performed for a few days but the bladder became infected and suprapubic cystostomy was carried out on February 16. The infection of the bladder rapidly subsided. Manual emptying of the rectum was required at this period.

On February 19 the bowels moved and a little urine was passed during a fit of coughing. The other neurological signs showed little change except that the left plantar response was now extensor while the right was still flexor.

By February 24, seventeen days after admission, his general condition had improved and he was once more alert mentally though rather querulous. There was slight increase in power in the legs and the bowels moved almost daily though he had no control over defaecation. The urine was now passed entirely *per urethram*, 5-6 ounces at a time, and he had approximately thirty seconds warning before the act occurred though he could not inhibit or control it. The suprapubic cystostomy was completely closed having been in operation for just under one week. The cystitis had almost entirely cleared up.

By March 3 there was further increase in the muscular power of the legs which were now spastic with brisk knee and ankle jerks and with slight knee and ankle clonus on both sides. Both plantar responses were equivocal but tended to be extensor. Bladder function was almost completely automatic, about 10 ounces of urine being voided at a time with a slightly longer warning period. There was no change in the sensory manifestations. During the ensuing weeks slow improvement was maintained. On April 20 he was taken out of doors on a trolley and on April 30 in a wheeled chair.

Re-education of the ataxic muscles was commenced at an early stage, at first by simple exercises in bed, later, by increasingly complicated movements and finally by lessons in walking. By August 18 he was able to walk across his room with the aid of a wheeled support and early in September he commenced to use crutches. His performance was fair but he had to be assisted to the erect posture owing to the great weakness of the glutei which were extremely atrophied and showed reactions of degeneration. When last seen on October 17, 1943, his general condition was good, he was cheerful and alert mentally and was studying Arabic. The bowels moved somewhat irregularly but sphincter control was good. Bladder

function was still largely automatic though there was some power of inhibition and some degree of bladder sensation was present. On a normal fluid intake, micturition occurred every two to three hours and up to 12 ounces of urine were passed at a time. He could initiate the act by pressing on the weak lower abdominal muscles with his hands and breathing deeply. The remainder of the clinical picture at this time may be summed up as a spastic paraplegia with almost complete loss of muscle-joint and vibration senses in the legs and with gross blunting of touch, pain and temperature sensibility up to the level of the xiphisternum. The lower abdominal muscles and the glutei appeared to exhibit a lower motor neuron type of paralysis. Repeated clinical examination revealed no evidence of any other disease and X-ray examination of the spine showed no abnormality.

COMMENT.

The incidence of neuromuscular accidents following anti-rabies vaccination is small and varies with the method of inoculation adopted. Available statistics show a relatively higher incidence (1 : 2-3,000) after methods employing desiccated cord preparations, whereas after killed phenolized vaccine it is low (1 : 10,000). The ætiology, classification and pathology of these accidents are still not clearly elucidated. It would appear that there are four main views as to their ætiology.

(1) That they represent a form of rabies caused by street virus, acquired when bitten by a rabid dog or other animal, the virus involved being antigenically different from the virus fixe of the vaccine used.

(2) That they are due to virus fixe present in the vaccine.

(3) That they are caused by some constituent of normal nervous tissue, as yet unidentified, present in the vaccine.

(4) That they are produced by a neurotropic virus present in the body and activated by some constituent of the vaccine.

General opinion favours the view that the majority of neuromuscular accidents following anti-rabies vaccination are either due to rabies virus, in which case they represent a form of rabies, or to some constituent of normal nervous tissue present in the vaccine.

CLASSIFICATION.

Though exact classification of these conditions has not yet been achieved, five main types of paralytic phenomena may occur :—

(1) Landry Type. Here the onset is usually towards the end of, or shortly after, a course of vaccine. The clinical features are flaccid paralysis of the legs and retention of urine and faeces. The paralysis frequently spreads to the arms. Mortality is about 30 per cent and recovery, when it occurs, is usually rapid.

(2) Lumbo-dorsal Paralytic Type.—This, the commonest type, is characterized by a febrile onset associated with weakness of the lower limbs, which later become more or less completely paralysed ; there is also diminished sensation and sphincter disturbances occur. The upper limbs are rarely involved and the underlying lesion is said to be a myelitis of the lumbar-dorsal region of the cord. The mortality is about 30 per cent and recovery is stated to be in general rapid.

(3) Neuritic Type.—Characterized by temporary paralysis of one or more nerves.

(4) Gordon's syndrome which is essentially a meningo-encephalomyelitis.

(5) Paralytic Rabies which is a form of rabies unprevented by vaccination or which may be due to the virus fixe of the vaccine. This condition shows the usual rabies incubation period and there are some hydrophobic manifestations. It is always fatal.

PATHOLOGY.

Here again there is no uniformity of description. Widespread degeneration of ganglion cells appears to be the rule. Some observers have described demyelination as a prominent feature whereas in other cases it has been entirely absent. Perivascular cuffing and lymphocytic infiltration are also described in some cases. In paralytic rabies, it may be possible to isolate the virus from the nervous tissue and Negri bodies may be present.

In the present case there are certain noteworthy features. The period between the last dose of vaccine and the onset of paralysis was long, namely twenty-nine days. Certain,

possibly irritative, symptoms did occur as early as four days after the last dose. From the time when weakness of the legs was first noted it was a further nine days until the paralysis reached its maximum. The incompleteness of the paralysis and of the sensory loss with most severe involvement of the muscle-joint and vibration senses in the legs was notable as was the rapid recovery of bladder function.

The case resembles most closely the description of the lumbo-dorsal type. Much more recovery appears unlikely and indeed the improvement so far observed has been largely due to the re-education of the muscles. Some further improvement may occur as re-education progresses but the weakness of the glutei and lower abdominal muscles is a serious handicap. The excellent mental attitude of the patient to his disabilities and his determination to overcome them were potent factors in his progress.

SUMMARY.

A case of paraplegia following anti-rabies vaccination is described and brief reference is made to the nature of such paralytic phenomena.

Owing to Service conditions reference to the literature has not been possible but an exhaustive review of neuromuscular accidents following anti-rabies vaccination is given in "Virus Diseases in Man," by C. E. van Rooyen and A. J. Rhodes, London, Humphrey Milford, 1941, to which full acknowledgment is made.

LESIONS OF THE SEMI-LUNAR FIBROCARILAGES: A STUDY OF THE TYPES, POSITIONS AND PATHOLOGICAL CHANGES.

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In a series of 800 consecutive knee cases that one had treated in military hospitals it was found that 241 patients had lesions of the fibrocartilages or menisci and it is possible the number should be somewhat higher as several doubtful cases were excluded. Accurate records of the types and positions of the cartilage lesions were made at the time on all cases operated upon and the excised cartilages, together with a portion of synovial membrane, were sent for pathological examination. The findings are summarized below.

The cartilage lesions were distributed as follows: 176 patients with internal cartilage tears, 73 per cent; 40 patients with external cartilage tears, 17 per cent; 23 patients with cystic cartilages, 9 per cent; 2 patients with discoid cartilages, 1 per cent (percentages calculated to nearest whole number).

Five patients had tears of both internal and external cartilages in the same knee; the diagnosis was confirmed at operation.

Operative findings supplied details about the type and position of the tear in 138 internal and 33 external cartilage cases and in all 25 of the cystic and discoid group. Eight other operations were performed for the removal of posterior horns which were causing persistent trouble, following previous operations elsewhere, but these are not included in the following calculations.

The types of lesion encountered varied from an incomplete transverse tear to almost complete longitudinal shredding of the fibrocartilage with every intermediate variety imaginable. An elaborate classification could be devised but, for simplicity, they can be divided into four main groups:—

- (1) Transverse: Where the cartilage is torn across the direction of its fibres.
- (2) "Bucket-handle" or Longitudinal: Where the cartilage is torn along the line of its fibres.

(3) *Tongue or Hinge* : Where a tongue-shaped piece is avulsed from the inner border but retains a hinge-like connection at its base.

(4) *Combined* : Where two of the above occur in the same cartilage.

The types of tear in 138 internal cartilage cases (only those proved at operation were taken) were as follows : Bucket-handle 66, 48 per cent ; transverse 38, 27 per cent ; tongue 22, 16 per cent ; combined 12, 9 per cent.

There were only 33 proved cases of external cartilage tears, but the figures are given for what they are worth : Bucket-handle 3, 9 per cent ; transverse 16, 49 per cent ; tongue 14, 42 per cent.

The next analysis shows that the position of the tear is as variable as the type. In 138 internal cartilage cases the distribution of the tears was : Anterior 35, 25 per cent ; at or near centre 7, 5 per cent ; posterior 18, 13 per cent ; longitudinal 66, 48 per cent ; combined 12, 9 per cent.

In 33 external cartilage tears the corresponding figures were : Anterior 12, 36 per cent ; posterior 18, 55 per cent ; longitudinal 3, 9 per cent.

Cystic and discoid cartilages accounted for 25 cases of internal derangement in this series and all except three of the cysts were mis-diagnosed when they arrived as out-patients. The discoid cartilages were found by chance when the joints were opened ; the clinical features suggested tears of the external cartilages and the abnormal structures were in fact torn. These congenital anomalies are seldom diagnosed in adults before operation and, in two cases in this series and in two others one has seen, the loud clicking described by certain writers was absent. Cystic cartilages, however, are easy to diagnose, and it was clear that many medical officers were unfamiliar with the three suggestive clues to the diagnosis :—

(1) The existence of a slowly growing swelling of almost bony hardness on the joint line, usually about the mid point of the cartilage.

(2) The character of the pain which usually begins as a dull ache and slowly increases in severity.

(3) The absence of a definite history of injury in most cases. There are other features common to any other internal derangement of the knee but the diagnostic triad—no definite injury, aching, and a tense swelling on the joint line—is highly suggestive. The aching normally precedes the discovery of the swelling by weeks or even months, and eight patients in this series were unaware of the swelling.

Cystic changes are more common in the external than in the internal cartilage, in this series the ratio being 9 : 2. The commonest site was the outer border of the intermediate half of the cartilage and invariably the mass was polycystic. The cysts varied in number and size, individual ones seldom being larger than a pea, although two reached the size of a walnut and still larger cysts have been described. At operation unless the entire meniscus is removed recurrence may occur in the part remaining ; there were 3 examples of this in the 23 cases treated.

Pathological Findings.—The excised fibrocartilage, except for the presence of the tear, occasionally showed no microscopic changes in cases of recent injury. All others were altered in some way. The hyaline elements suffered more than the fibrous but the fibres themselves often appeared swollen and structureless. The cells showed a tendency to elongate, their nuclei stained poorly, and the cell lacunæ were often diminished in size or altogether absent. Attempts at vascularization were sometimes apparent at the margins of the tear and commonly there was an increase in the number of vessels at the transitional area between cartilage and synovial membrane, with deeper cartilaginous penetration of the vessels.

Calcification was not uncommon, being found in 12 per cent of the specimens, but the earlier ones were not specially stained from this point of view and this percentage is therefore almost certainly an underestimate of the frequency. The deposits were usually microscopic being deposited in rows between the fibrous bundles or collected into minute discrete nodules. No example of ossification was found in this series but, in one case, a calcified plaque from synovial membrane showed areas of ossification.

The synovial membrane in early cases showed little or no pathological change. In chronic cases it was thickened, even redundant, and the surface shaggy or fringed due to excessive papillation. The lining cells in some cases were swollen or formed branching finger-like processes projecting into the subjacent fibrous tissue. A round-celled infiltration of the sub-endothelial tissues was common, associated with an increase both in vascularity and in the amount of fibrous tissue. The picture, therefore, was that of a chronic, non-specific, inflammatory process.

Pathological reports which conflict with the clinical findings must be treated with reserve. The following was a case in point. It was reported that a piece of synovial membrane taken while removing a torn cartilage showed signs of tuberculous infection; this was confirmed by several experienced pathologists. The patient, however, made an unusually rapid recovery and he was treated as a non-tuberculous case on account of the negative clinical findings. This decision was justified by events as the soldier reported every month for six months after discharge from hospital and developed no manifestation of any local or general infection.

The discoid cartilages were only abnormal macroscopically. The cystic cartilages were abnormal both macroscopically and microscopically. The cysts were usually confined to one area of the outer border of the cartilage, they were multilocular, they contained a clear mucoid substance and the walls appeared to be more transparent than ordinary fibrocartilage. Under the microscope various stages of cyst formation could be studied in the same specimen. The fibrocartilage began to lose its normal architecture of parallel fibres and cells, the nuclei appeared degenerate and stained faintly, the fibres seemed swollen and structureless and ultimately they split or separated to form a spongy and relatively acellular meshwork in which clefts appeared. Some of these crevices became enlarged and rounded to form cysts, often lined by a single layer of modified flattened cells. The surrounding fibrocartilage showed islands of degeneration, necrosis, or myxomatous change, or appeared more fibrous than normal. The general impression created was of degenerative rather than of inflammatory changes.

One wishes to thank Brigadier P. Wiles, Colonel H. D. F. Brand and Colonel L. A. J. Graham for permission to forward this article. Amongst the pathologists who have examined the specimens one is especially indebted to Captain A. D. Morgan, Major D. T. Stewart, and Captain J. E. Craik.

AN IMPROVISED STILL.

BY MAJOR BENJAMIN PORTNOY,

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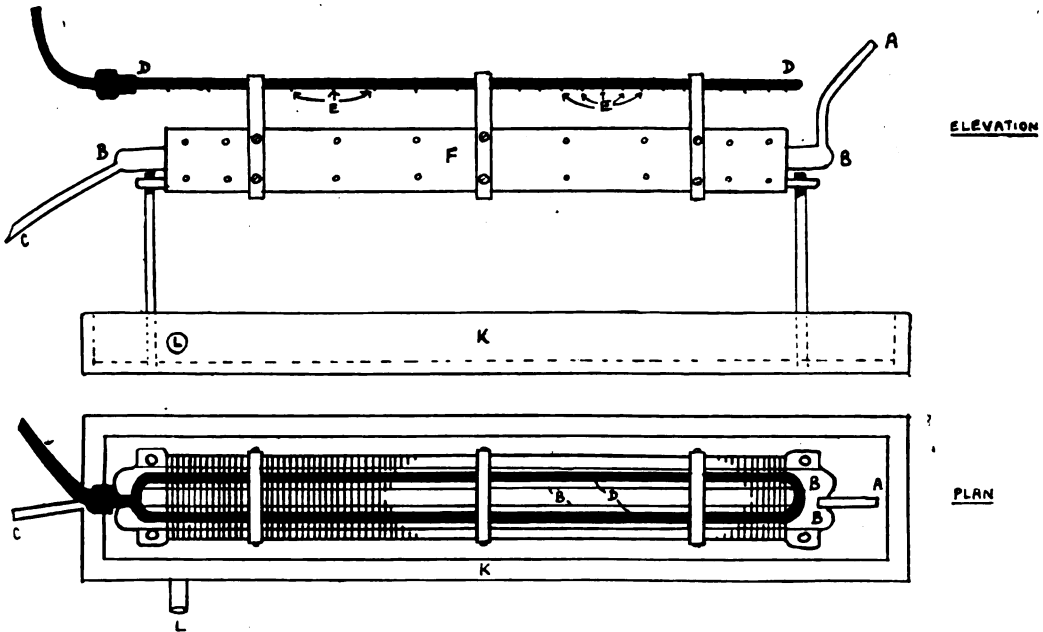
Officer Commanding a Mobile Bacteriological Laboratory.

An improvised still is described below which has been used successfully in the field where an adequate water supply for cooling is often limited. The still was built around a salvaged internal heater from an ambulance. In its original form the heater consisted of two copper tubes (B) joined at each end and passing through about one hundred corrugated metal plates, the whole acting as a very efficient radiator. The method of modification was as follows:—

Copper tubes A and C were soldered into the junction of the pipes B at each end. It was found that when steam was passed, *via* A, along the copper pipes B, the cooling power of the corrugated metal plates was sufficient to give a good supply of distilled water at the outlet C. The apparatus became too hot after about half an hour and some additional form of cooling had to be devised. Manual cooling with the aid of a large sponge and a bucket of water was successful but, in order to make the apparatus more automatic, an arrangement was set up by which cold water dripped on to the steam pipes B. A very elongated O-shaped copper tube (D) with holes (E) bored along its under surface was suspended by three brackets above the apparatus so that its two long limbs were exactly above the two steam pipes B

When cold water is passed into the tube (D) it drips on to the whole length of the two pipes (B) and gives efficient cooling. The whole still was bolted down into a wooden, tin-lined, shallow box (K) with an outlet (L). This outlet is the overflow from K and, *via* this, the waste water is collected in a bucket.

In using the still a bucketful of cold water at a higher level than the apparatus is siphoned slowly into D regulating the rate of flow by means of a screw-clip on a piece of rubber tubing. When the bucket is almost empty it is refilled, using the waste water from L—by this means only one bucketful of water is needed to work the still for a long period. With the exhaust valve of the laboratory autoclave as the source of steam a yield of about 4 pints of distilled water is obtained hourly—this has been found to be of high quality.



The approximate dimensions of the apparatus are as follows :

Internal diameter of tubes A, D and C is 7 mm. and that of B is 20 mm. The water dropping holes (E) bored in D are at 1 cm. intervals in the half of D nearest to C. The latter arrangement is necessary because the steam inlet side gets much hotter than the water producing side and therefore needs more than its share of cooling. The corrugated iron plates are 10 cm. square and it is probable that if they were many times this size the apparatus could be worked without any water cooling.

My thanks are due to Colonel J. S. K. Boyd, D.D.P., M.E.F., for his interest in the apparatus, and to the D.M.S., M.E.F., for permission to forward this article. This article was actually submitted in June, 1942, but was lost by enemy action.

A CASE OF ADDISON'S DISEASE OF TUBERCULOUS ORIGIN.

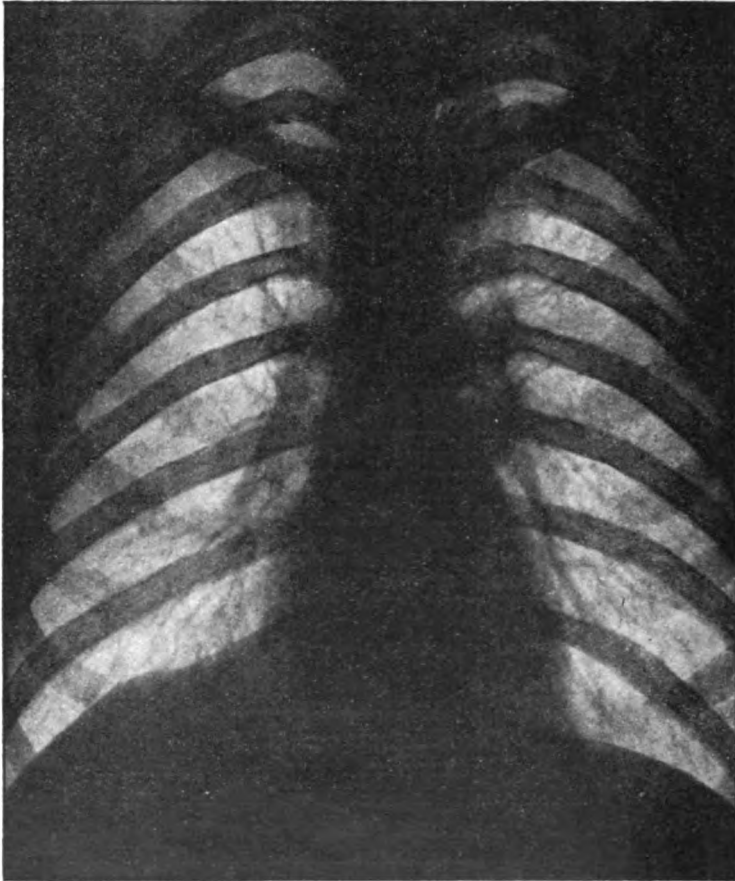
BY LIEUTENANT P. FRANKEL,
Royal Army Medical Corps.

THE patient, aged 29, a serjeant, Royal Artillery, was admitted to E.M.S. Hospital, Preston Hall, on July 21, 1943. Until 1938, when he enlisted, he had been a factory worker. His

past medical history was good but there was a poor family history. His mother had had pulmonary tuberculosis and his father, one brother and a sister had died of it.

He gave a history of increasing lassitude and dyspnoea over the past six months and for the previous two months there had been occasional vomiting and fainting attacks. The latter were probably hypoglycæmic in origin. For the last month he had noticed his skin was getting darker. He had lost weight and he had had some small hæmoptyses.

On examination he was a thin ill-looking man. There was diffuse pigmentation which was most marked in the skin over the flexures and about the genitals. There were pigmented patches on the inner surfaces of the cheek as well as two patches on the tongue. He



was pyrexial, pulse 72 and respiration 20. No abnormal physical signs were observed in heart or lungs. B.P. 115/70.

Blood chemistry was as follows: Serum sodium, 252 mgm. per cent (325-350)¹; serum chloride, 315 mgm. per cent (340-380); serum potassium, 22.1 mgm. per cent (16-20); blood urea, 45 mgm. per cent; blood sugar, 86 mgm. per cent. Blood count: R.B.C. 5.4 mill.; Hb. 93 per cent; C.I. 0.86; W.B.C. 7,200; W.R. negative.

X-ray of chest showed lung fields clear apart from a minute opacity above left clavicle. Seen through the heart shadow there was a spindle-shaped opacity stretching from about D8 to L1. Although it could not be seen on a lateral view, nor did an X-ray of the spine itself reveal any abnormality, this was diagnosed as a spinal abscess. As regards the Addison's

¹Normals are shown in brackets.

disease, in view of the family history and the probable presence of a spinal abscess, the underlying pathology was regarded as tuberculous.

Treatment was on conventional lines: DOCA¹ 5 mgm. four times daily and a salt mixture. After a period on this there was improvement in patient's condition and the blood chemistry showed: Serum chloride, 462 mgm.; serum sodium, 332 mgm.; serum potassium, 20 mgm. and blood urea, 32 mgm. per cent. Although the general condition continued to improve he remained pyrexial at about 101° F. On August 15 he complained of pain in the right chest and dyspnoea with physical signs of a right pleural effusion. Aspiration produced a straw-coloured fluid with lymphocytes. The fluid was sterile. On August 17, X-ray showed that the abscess had slightly increased in size: the right costophrenic angle was obscured by a small effusion and there was some right lower lobe collapse. The patch at the left apex was now more obvious with well-defined edges and a ground-glass appearance. It was not regarded as affording evidence of active infiltration, particularly as the effusion was on the opposite side. The fluid was absorbed rapidly and, apart from the continued pyrexia, patient's condition was fairly satisfactory. On August 27, B.P. was 130/75 and the blood chemistry had reached normal with blood urea now at 16 mgm. per cent. Treatment with DOCA and salt with iron for the anaemia was continued. A small hæmorrhage had been seen in the right fundus, but it disappeared three weeks later. In September epigastric pain, accompanied with vomiting, recurred and from now on his condition deteriorated. At this stage it was difficult to assess the significance of any particular symptom as both toxæmia and Addison's might have caused vomiting whilst the epigastric pain might have been caused by irritation of the posterior nerve roots by vertebral disease. On October 11 exploration from the back was carried out with a stout needle which was inserted close to the spinous process of 10D, 60 c.c. pus being obtained 2½ inches beneath the skin; 5 c.c. promanide was injected. On the same day chest X-ray showed a most unusual appearance. The shadow of the spinal abscess was unchanged in size but showed a fluid level due to air having entered through the needle; the patch at the left apex was unaltered in appearance.

On October 15 an Addisonian crisis occurred. The patient became increasingly drowsy, vomiting was incessant and blood-pressure fell rapidly. Increasing doses of DOCA with glucose saline transfusion caused only temporary improvement and patient died on October 17. Blood urea just before death was 88 mgm. per cent.

Post-mortem examination disclosed an active tuberculous focus at the left apex with an area of caseation and a small cavity. Both adrenals were three times their normal size and consisted entirely of caseating tuberculous material. Overlying the vertebræ, from about D4 to L2 there was a large spindle-shaped abscess. The anterior wall was formed by the anterior longitudinal ligament and the posterior by the vertebral bodies, which were extensively diseased. 10D showed a deep hole which contained caseous material.

COMMENT.

(1) The post-mortem finding of an active pulmonary lesion illustrates the difficulties in interpreting the significance of an opacity on an X-ray film, even when a series is available for comparison. The development of a bilateral pleurisy, though of tuberculous origin, was incidental. The presence of a pleural effusion on one side does not exclude a dry pleurisy on the other. Pleurisy has no localizing value with regard to the underlying lung lesion.

The sequence of events in this case is regarded as follows: an active tuberculosis of the lung, with pleurisy, led to tuberculosis of the adrenals and Addison's disease on the one hand, and to caries of the spine and a tuberculous spinal abscess on the other. Spread took place by the blood-stream and, had the patient lived longer, other foci would no doubt have made their appearance.

(2) Recognition of the nature of the shadow of a spindle-shaped opacity behind the heart in an X-ray may be difficult. Tumour and aneurysm have to be excluded. The writer has seen three cases of pulmonary tuberculosis in which spinal disease was not suspected until the

¹ This is a contraction for Desoxycorticosterone Acetate.—Ed.

abscess was discovered. It is therefore to be presumed that abscess formation may be a very early result of spinal caries and may exist even before radiological evidence of the latter is available. The skiagram of every case of pulmonary tuberculosis must be closely examined as, in non-penetrating films, the characteristic shadow may easily be missed.

(3) In the present case the course and response to treatment of the Addisonian element was masked by the underlying tuberculous disease. It is also difficult to explain why the blood levels of sodium and chloride returned to normal so soon after commencement of specific treatment.

(4) Since the beginning of the war nearly 2,000 cases of tuberculosis of lung have been admitted to Preston Hall. The present case was the first to present the accompaniment of Addison's disease.

SUMMARY.

(1) The clinical course and post-mortem findings of a case of Addison's disease of tuberculous aetiology are described and discussed.

(2) The significance of the discovery of a spinal abscess in a skiagram of the chest is stressed.

Acknowledgment is made to Dr. McDougall, M.D., F.R.C.P.E., for permission to forward these notes.

Reviews.

A SYNOPSIS OF HYGIENE (Jameson and Parkinson). Eighth Edition. By G. S. Parkinson D.S.O., M.R.C.S., L.R.C.P., D.P.H. London: J. & A. Churchill, Ltd. 1944. Pp. xvi + 719. Price 25s.

This Synopsis has been for nearly twenty-five years a standard work on general hygiene and particularly favoured by students.

The new edition has preserved the high standard set by previous editions and has been brought up to date by the inclusion of the latest advances in all directions.

The war years have increased the tempo of new work and the new edition has kept pace with the knowledge gained since 1942: for example, the section on parasitology has been extended and a new chapter devoted to a brief account of the uses of the sulpha-drugs and penicillin.

Public Health Law has been revised and brought up to date and now includes much of the emergency legislation of the war years.

A real effort has been made to keep the book down to reasonable proportions and certain sections have been decreased or omitted without loss to general usefulness.

The 1944 edition of "A Synopsis of Hygiene" will satisfy all the high expectations which student and public health officer alike have learnt to appreciate.

TEXTBOOK OF SURGICAL TREATMENT, INCLUDING OPERATIVE SURGERY. Second Edition. By C. F. W. Illingworth, M.D., Ch.M., F.R.C.S.E. Edinburgh: E. & S. Livingstone. 1944. Price 30s. net.

The fact that a second edition of this excellent Scottish textbook written by Professor Illingworth and eighteen collaborators has been called for fifteen months after the publication of the first edition speaks for itself. The whole work is well written and the expressions of opinion sound and in line with modern thought. The paper and printing are excellent and the illustrations, some of which are in colour, are first class.

In a book such as this it is hard to find fault. Considering nearly the whole field of surgery is covered necessarily some subjects are not treated in great detail. A noticeable omission, however, is non-specific epididymitis.

The chapter on burns has been completely re-written and covers the whole subject, giving

an excellent account of the recent work done in the Burns Unit established in the Glasgow Royal Infirmary.

Students, practitioners and operating surgeons will be well repaid by reading "Illingworth" and, no doubt, in another fifteen months a third edition will be as welcome as the second is now.

DOCTORS IN THE MAKING: THE ART OF BEING A MEDICAL STUDENT. By Arthur W. Ham, M.B., and M. D. Salter, M.A., Ph.D. London: Medical Publications, Ltd. 1944. Pp. 120. Price 9s. 6d.

Although every student's career is beset with difficulties we never realized, until reading this book, that they could be so many and complex. We feel that a prospective medical student would be terrified rather than encouraged. The graduate in medicine will be reminded of the shortcomings of his student career with tolerant and quite unrepentant amusement.

We are not quite sure for whom the book is intended. It does not seem to be a book which the average medical student in his early years will read; it might be of interest to those who are responsible for the supervision of students in general.

Correspondence.

WEST AFRICAN "P.U.O."

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Having just completed one year's work as Officer i/c Medical Division in a West African Military Hospital, I was interested in the paper by Captain Elliott published in the Corps Journal for May, 1944. With much of what the writer says I am in agreement, but four of his statements appear to warrant further discussion.

(1) In Table I "P.U.O." appears second on the list of predominant medical diseases, with 166 cases. Now this is a high figure and should not be specified as such without some further description of what the group comprises. We are all familiar with the short illness of which "P.U.O." is perhaps the most honest description—considerable numbers are liable to occur among troops in any tropical area. But a final diagnosis of "P.U.O." implies an extensive and prolonged series of negative investigations and is normally frowned upon, and rightly so, by Military Medical Authority. Short term fevers with negative findings obtain a variety of names with a view to circumventing this difficulty. In Egypt it was "Sandfly Fever," in West Africa it may be "Clinical Malaria." But a clinical diagnosis of malaria with negative blood films may be made with reasonable certainty in many cases and, in fact, often constitutes from 20 to 30 per cent of all final diagnoses of malaria. (It is obvious of course that the proportion of such diagnoses depends on the reciprocal efficiency of the clinician and the laboratory.) This is just my point; what are Captain Elliott's "P.U.O.s"? If they represent what has been described as clinical malaria, the percentage, about 14, is commendably low. If, however, "clinical malaria" is included in the 1,038 cases, then a residuum of 166 unexplained pyrexias is extraordinarily high.

(2) Captain Elliott mentions that both European and African blood donors must be assumed to be infected with malaria and that the "transfusion officer's lot is not a happy one." But he does not mention the relatively high incidence of yaws-syphilis amongst Africans and the still higher incidence of positive Kahn reactions. That many of these may be transient or due to tertiary yaws does not make the problem any easier and in practice it may mean the exclusion of perhaps a third or more of potential African donors.

(3) Under the heading Cerebrospinal Fever in Africans, he attributes failure of chemotherapy in the fatal cases to "a coincidental encephalitis." Does this mean a meningococcal encephalitis, which is of course a recognized lesion occurring in meningococcal infection?

And why was the failure due to an encephalitis ; might not the reverse be true ? One would like to know more about this.

(4) Lastly, Captain Elliott makes the astonishing suggestion that in bacillary dysentery the dosage of sulphaguanidine or sulphasuxidine may be adjusted in direct relation with " the fluid volume of the stool."

Does this mean the volume only of fluid stools, or of the fluid part of a stool ? How is it measured, especially if there are 100 or more dysentery patients in the wards at one time, as may frequently occur in an endemic area ? In point of fact, the volume of the stools is to the progress of the disease in inverse proportion in severe acute cases of bacillary dysentery. There may be thirty or more stools in twenty-four hours but such stools at this phase each consists of a few c.c.s only of non-fæcal tenacious blood-stained mucus, aptly compared, in some instances, with pneumonic sputum and in fact they will not pour out on inversion of the bedpan, a fact which I was able to observe many times in the Middle East. The total volume of such stools, if it could be measured in any easily practical way, which I doubt, is often very small. Captain Elliott would, on his system, reduce the dose of the drug during this stage, just when it is most needed.

West Africa,
July, 1944.

I am, Sir,
Yours, etc.,
W. M. PRIEST,
Lieut.-Colonel, R.A.M.C.

VISUALIZATION OF LIVER ABSCESES.

TO THE EDITOR OF THE " JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—With reference to Colonel Cameron's paper on the Visualization of Liver Abscesses in your issue of January, 1943, p. 1.

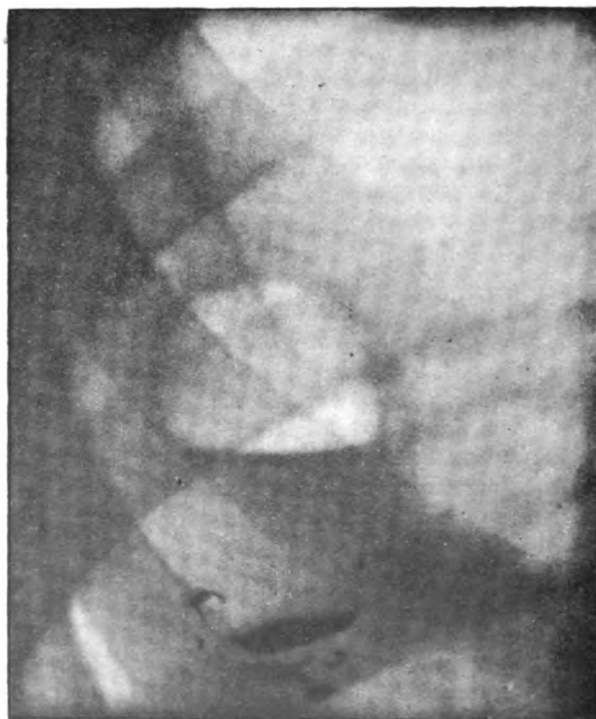


FIG. 1. - Encapsulated empyema after a replacement and lipiodol injection.

I would like to outline briefly a method we have used in a British General Hospital, M.E.F., which has at the same time both given us full information as to the site and size of the abscess and the amount of pus it contains. It has proved quite without ill-effects to the patient.

Needling is done at the point of maximum tenderness and when the abscess has been located 20 c.c. of pus are withdrawn and replaced by 15 c.c. of air and 1 c.c. 20 per cent (heavy)

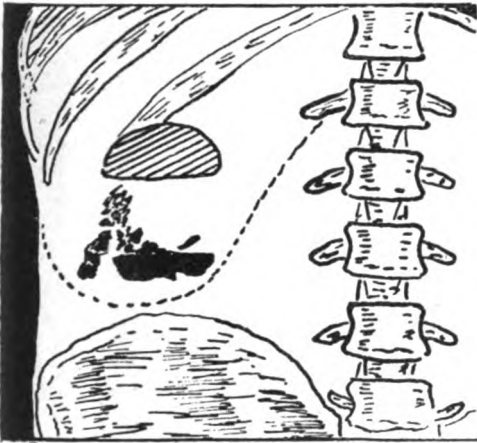


FIG. 2.—Abscess in right lower lobe of liver.

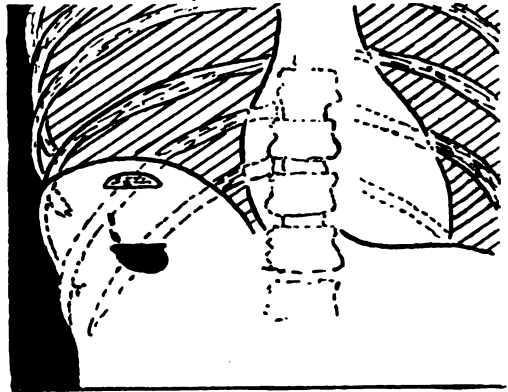


FIG. 3.—After aspiration, air and oil injection. Three layers—air, pus, oil.

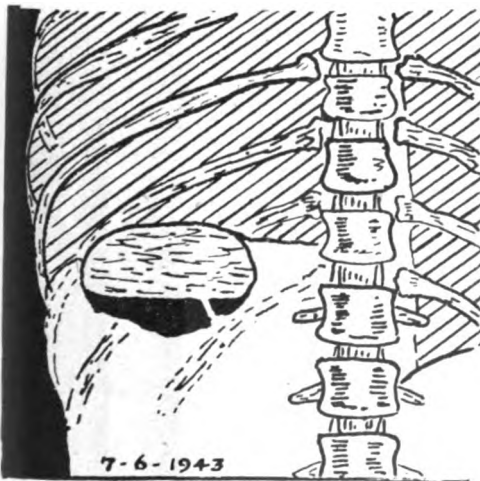


FIG. 4.—After further aspiration (a) diminished size ; (b) air and oil-kissing pus entirely removed.

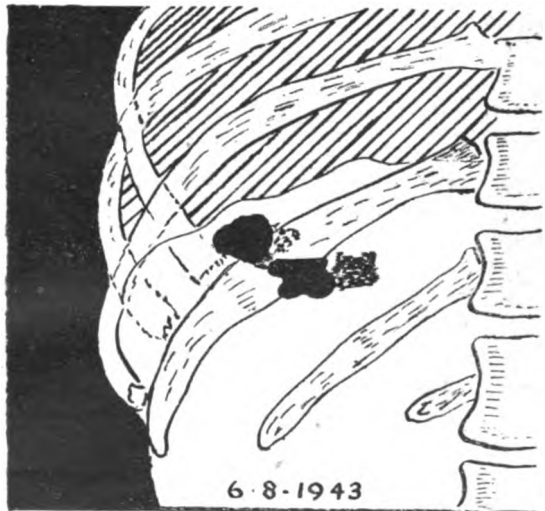


FIG. 5.—Final result. Two blobs of oil ; no cavity.

lipidol. The film (from an encapsulated empyema visualized by this method) and the series of drawings (from two cases of liver abscess) illustrate the result (see figs. 1, 2, 3, 4 and 5).

Three layers, air, pus and oil, are easily recognized. If it is necessary to aspirate the cavity at a later date the line of demarcation between pus and oil can easily be projected to

the skin under the fluoroscope, and thus most of the pus will be removed in the second tap. This having been done only two layers will be left, air and oil-kissing pus.

Serial films at suitable intervals will show the progressive shrinkage of the cavity (during emetine course) until only a small residual blob of oil remains. By this means complete information as to the healing of the cavity or the necessity for further aspiration may be obtained.

No ill-effects from the lipiodol (which must be straw-coloured and not brown) were anticipated from what is known of its use in neurological diagnosis; nor have such ill-effects been encountered in the visualization of three liver abscesses and many intrathoracic cavities, both intra- and extra-pulmonary, which have been outlined by this method.

My thanks are given to Serjeant Colman, R.A.M.C., Radiographer at a British General Hospital, who made the drawings.

July 6th, 1944.

I am, etc.,

CH. SCHEIBER,

Major, R.A.M.C.

Notices.

" SOME EXPERIENCES WITH A PARACHUTE SURGICAL UNIT."

MAJOR C. J. ROB, R.A.M.C., the author of the above article, published in the April, 1944, number of the *Journal*, informs us that his paper was written and submitted for publication over twelve months before its actual publication and that subsequent experience with the C.M.F. has changed many of the conclusions reached. Major Rob's paper, however, was not received by us until 22 May, 1943 and owing to extreme pressure on our space it was not possible to print his article before April, 1944.

" THE USE OF PLASTER OF PARIS IN THE TREATMENT OF BURNS "

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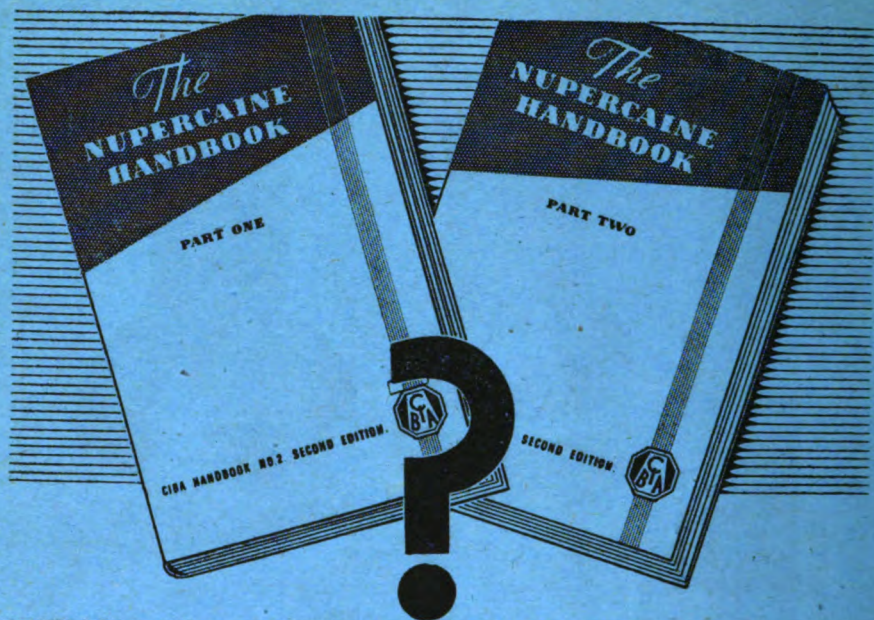
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THE EVACUATION OF CASUALTIES FROM A NORMANDY BEACH.

BY MAJOR D. F. HUTCHINSON,

Royal Army Medical Corps,

AND

MAJOR H. R. CHAPMAN,

Royal Army Medical Corps.

THE problem of evacuating casualties in the initial stages of the assault on the Normandy Beaches had been very carefully planned and was carried out from each of the three British sectors by an organization known as a Casualty Evacuation Point, consisting of one-half of a Field Dressing Station in each case.

These C.E.P.s set up on, or near to, the Beach selected were responsible for evacuation of all casualties by sea from their sector.

The method to be adopted was to use D.U.K.W. transport to Landing Ships Tank anchored at sea.

The exigencies of the situation caused deviations from the plan laid down—for instance, on one beach the number of casualties by 14.00 hours on D-Day before the C.E.P. was established rendered it necessary to transport those fit to move by Landing Craft Tank to Ships in the anchorage. By 16.00 hours the C.E.P. Commander on this beach had arrived and collected sufficient D.U.K.W. to start, in a small degree, as planned.

The main body of the C.E.P. on this beach did not arrive until the next evening when it proceeded to its selected site. It is the opinion of all concerned in this phase of the operation that the C.E.P. should have been phased in considerably earlier.

During the ensuing seven days the C.E.P. continued to evacuate casualties to L.S.T. with the important exception that, from D+1 onwards the L.S.T. were beached, emptied of men and stores and filled with casualties before unbeaching. On June 12 it was necessary to recall the personnel of Numbers 1 and 2 C.E.P.s, which were the halves of a Corps F.D.S., in order that they could reform for their normal role.

Since the evacuation of casualties still had to take place over the beach, owing to the fact that no port of any size had been captured, it was necessary to set up some other organization to take over the work. In the central sector one of the F.D.S.s (commanded by D. F. H.) which had formed part of the Beach Group operating on these beaches was selected. This

F.D.S. was still carrying out its role of dealing with local casualties, but these had fallen in number very considerably, so the F.D.S. commander was able to set aside a part of his staff to undertake these new duties. For administrative reasons it was considered advisable to locate the C.E.P. on the site where the F.D.S. was working, about a mile from the beach. This proved, in fact, a help rather than a hindrance. It was possible to do more for casualties in the comparative peace of an orchard than in the inevitable turmoil near a beach where men and vehicles were being unloaded day and night.

During the course of the next few days it was decided to evacuate all casualties occurring on the British front through the C.E.P. on the central sector. To do this expansion was necessary, so another F.D.S. (commanded by H. R. C.) which had been performing a Beach role on a neighbouring beach was placed under command and moved to the location. Owing to lack of space this F.D.S. set up in an orchard on the opposite side of the main road and worked alternately with the original F.D.S. As the volume of stretcher bearing had now become very heavy a Pioneer Corps company trained in stretcher bearing, which had been split up amongst the various medical units in the sector, was concentrated at the C.E.P. They were accommodated in neighbouring orchards as was the platoon of the D.U.K.W. Company, consisting of 33 D.U.K.W.s, on which the C.E.P. had first call.

It was found necessary to augment the land transport of the F.D.S.s so a section of six ambulance cars from the newly arrived M.A.C. was attached, giving a total of seven ambulance cars, 8 3-ton lorries and up to 30 D.U.K.W.s available at all times for carriage of casualties from the C.E.P. to the point of embarkation.

A suggestion made by the D.D.M.S. that Nursing Officers should be attached was gratefully accepted and the number was rapidly increased from six to sixteen, all of whom contributed very largely to the well-being and comfort of the casualties.

Whilst this re-organization was going on an attempt was made to formulate a policy for the C.E.P. and the following cardinal principles were laid down, which were adhered to whenever the exigencies of the situation permitted, throughout the period the C.E.P. was operating.

Every patient sent to the C.E.P. was to be : (i) Seen by a medical officer on arrival ; (ii) given a meal or at least a cup of tea ; (iii) have his dressings adjusted and such treatment, i.e. dose of penicillin or sulphonamide when due, given as required ; (iv) given comforts in the way of cigarettes and sweets ; (v) allowed to rest for such period as the evacuation permitted ; (vi) have his documentation checked to ensure that he was in possession of two copies at least of A.F.W. 3210.

Subsequent experience served to accentuate rather than diminish the relative importance of these factors and it cannot be over emphasized that none of these points should be omitted. In practice, owing to the very large numbers to be dealt with, often in a very short time, it was inevitable that some did not receive all the attention they required but the cardinal principles were ever in the minds of all concerned.

It soon became apparent that the site of the C.E.P. situated as it was on two sides of a narrow main road, which carried at this time most of the traffic from and to this beach, was gravely hampering smooth and easy evacuation and adding very greatly to the already difficult administration. Under the circumstances, therefore, further sites were reconnoitred and a Chateau which had been used by the French authorities as a Preventorium was taken over together with all the grounds within 600 yards of the central point.

As it was impossible to close down the activities of the C.E.P. during the move it was necessary to move by stages. This was completed quite smoothly in forty-eight hours in spite of the fact that during the middle period of twenty-four hours the largest total yet to be evacuated, over 1,600, was dealt with. At this stage it was possible to define duties and the following officers were appointed :—

Command.—The senior F.D.S. Commander was appointed O.C., C.E.P., with the other F.D.S. Commander as second in command. In practice this gave excellent results as one Commanding Officer was available at all times, day or night, for decisions which had to be given.

Evacuation Officers.—The seconds-in-command of each F.D.S. were appointed to do twenty-four hours on and twenty-four hours off—the off duty period being occupied with unit duties. The Evacuation Officer was made entirely responsible that the casualties required for the various craft were available at the times stated, properly loaded into transport previously requested from the transport officer, that the necessary number of sections of Pioneers as stretcher bearers were paraded where required, and the casualties despatched to the embarkation point to arrive at the correct time.

Control Officers.—The non-medical Officers of each F.D.S. were appointed on the same basis as Evacuation Officers. The Control Officer was stationed either on the beach if L.S.T. were being used, or at the harbour if small craft were being filled for hospital carriers. His duty was to ensure that the transport carrying casualties was directed to the right ship, that neither too many nor too few vehicles were available at each ship, and to check the numbers proceeding to each ship so that under or over loading would be prevented. This officer was provided with a jeep for his sole use. This was used as a focal point to which all transport reported on arrival.

Officer in charge Ship Loading.—It was found necessary to have a responsible Officer from the C.E.P. actually on board each ship being loaded, and the Subalterns of the Pioneer Company, four in number, did this duty on a roster. The Officer in charge Ship Loading was entirely responsible for the loading of the ship from the shore end and worked in close liaison with the Captain and Medical Officers of the ship.

Evacuation Transport Officer.—As each unit forming part of the C.E.P. was responsible for its own transport it was deemed necessary to appoint an Evacuation Transport Officer to control operational transport. The Officer Commanding the Platoon of D.U.K.W.s was given this duty and was given absolute control over D.U.K.W.s, ambulance cars and three tonners used for evacuation purposes.

These appointments dealt with the evacuation side of the picture and they were incorporated in Standing Orders.

The Reception side was also organized and it was found necessary to have three Medical Officers in Reception during the day and one at night. As approximately one per cent of casualties at this stage required further treatment of a surgical nature, a Surgical Wing of 40 beds was instituted, staffed by two (at times three) Field Surgical Units and one Field Transfusion Unit. This wing also dealt with local casualties and seldom had less than 30 patients occupying beds. The duty of reception medical officer consisted of an examination of each patient with a check of his treatment notes. He then had to decide whether the patient was fit for further evacuation immediately, the type of sea transport most suitable, or whether further treatment was required.

Should the casualty be found fit for further evacuation with no more than routine treatment he was passed to one or other of the general wards as the "Bed State" permitted. If the medical officer considered that the case was one unsuitable for travel on L.S.T. he was sent to A1 ward which took such cases as were judged suitable only for hospital carrier. When the medical officer considered that any case required further treatment, or in a case where he had any doubt, the case was sent to A2 ward which was visited at half-hourly intervals, or oftener if necessary, during reception by the duty surgeon who was the final judge of further treatment. If in the opinion of the duty surgeon further surgical treatment was required the patient was transferred to the surgical wing and there dealt with. In many cases the treatment required was such that a stay of as little as twenty-four hours was sufficient.

For administrative reasons the surgical wing was officially designated 2 Field Dressing Station, as it was necessary to show the patients as having been admitted to a medical unit since the C.E.P. was not classed as such.

From the documentary point of view any patient sent to the C.E.P. was marked on the evacuating unit's A.F.W. 3034 or 3034b as "Evacuated to U.K. by Sea," therefore if he was

not so evacuated it was necessary for the purpose of 2nd Echelon to show him as having been admitted to another medical unit.

In practice this system worked well and saved much clerical work which the C.E.P., as constituted, could not have performed.

The documentation done by the C.E.P. consisted of obtaining from each patient one copy of A.F.W. 3210 or A.F.W. 3083, whichever was used, and a nominal roll was compiled from these by ship loads, which was forwarded as follows: One copy to G.H.Q., 2nd Echelon; one copy to D.A.D.M.S. (E), Beach Sub Area; one copy to file.

In order to ensure accuracy these forms were not collected until the casualties were placed on board the ship or craft in which they were to travel. This was done by stationing a clerk at the ramp or gangway, whose sole duty was to detach the necessary forms and retain them in a bag until these could be sorted in the office.

Evacuation proper fell logically into two separate phases according to the type of vessel being used. A "Low Tide" or "L.S.T." phase when loading was done on to one or more "Dried Out" L.S.T.

A "High Tide" or "Carrier" phase when loading was done to a hospital carrier anchored three to five miles out by using either the carrier's water ambulances or an L.C.T. from the small harbour about two miles from the C.E.P.

At all other states of the tide the only loading possible was by D.U.K.W.s direct to the carrier. This a good method but impossible except in the calmest weather.

The calling forward of casualties to the craft rested entirely with the Naval Medical Liaison Officer so far as the availability of ships, and the D.A.D.M.S. (E) of the Beach Sub-Area, who was "in the picture" with regard to the availability of casualties. Once the word had been given to load, usually in consultation with the O.C. or second in command C.E.P., loading proceeded until either the ship was full, the weather or state of tide put a period to loading, or the supply of casualties "Dried up."

It had been reported that on previous landings difficulties had arisen owing to the lack of a "medically minded" Naval Liaison Officer, therefore, albeit at a late stage in the planning, provision was made for a Naval Medical Liaison Officer. His services were invaluable and it is difficult to see how the evacuation could have proceeded in a fashion so admirably, free of inter-Service difficulties, without his good offices.

The number of casualties requiring evacuation varied enormously from day to day. The figures ranged from over 2,200 to under 200. It was never possible to forecast from hour to hour, which made inevitable an air of improvisation. The number of ships available and the weather were often variable factors, but on only one day of the period June 13 to August 10 was no loading possible, and that was due entirely to unprecedented bad weather.

The L.S.T. was undoubtedly the standby of evacuation—its presence was more certain when required and the ease and speed of loading rendered it most valuable—in all 60 per cent of all cases for the period stated were evacuated by L.S.T. The great drawback to the use of these ships was the time taken after loading to reach home port (from twenty-four to thirty-six hours), the discomfort of stretchers on racks or tank decks compared with the cots of the Hospital Carriers, and the small numbers of medical officers and sick bay attendants for the numbers of casualties carried.

The accommodation of the L.S.T. was officially 144 lying cases accommodated in racks, and 100 walking cases accommodated in the troop decks. Additional cases could be carried on stretchers lashed to the tank deck. The maximum carried in one L.S.T. was over 450, who arrived safely.

About the middle of July the Surgeons, who had been carried by each (medical) L.S.T. in addition to the two M.O.s, were redrafted elsewhere and from then on it became more important than before to sort cases and to restrict the numbers to a 200 maximum where possible.

Evacuation by Hospital Carrier entailed much slower travel between C.E.P. and ship but once the case arrived on board the attention that could be given was of a much higher standard.

Once loaded the Hospital Carrier, which sailed independently, could be in the home port in ten to twelve hours—an obvious advantage.

Comments have arisen as to why some carriers proceeded to home port with only a small number of casualties, whereas on the same day L.S.T. were also used. This was inevitable owing to weather conditions preventing carriers being loaded and the limited period any carrier can stay on the far shore, owing to storage accommodation for coal and water being short.

The lessons learned from this operation were very many and as a result of day-to-day working various ancillaries were attached.

One difficulty in the early stages was that of communications between C.E.P., loading point and ship. This was overcome by the attachment of three signal personnel with wireless sets, which on the whole proved most valuable.

In an attempt to provide an easy flow of casualties to the C.E.P. a Liaison Officer from one of the Ambulance Car Companies was attached at a late stage and proved most helpful in every way.

Some difficulty was experienced in the early stages with regard to the blanket and stretcher exchange. It was the rule that every ambulance from forward areas should obtain a one for one exchange for these items. Owing to the large numbers dealt with the stocks fell very low. To counteract this, authority was given to hold a dump of 1,000 stretchers and 3,000 blankets. This successfully solved the problem although it was necessary for a "Q.M." representative to be present at all loading to ensure a return from the ships and craft. The dump was under the control of the Quartermaster of one F.D.S., whilst the other Quartermaster was responsible for all rations.

Enough cannot be said of the assistance given by the Nursing Officers, of whom 16 were attached. Let it suffice to say that in our considered opinion the smoothness of running and comfort of the patients rested in very large measure in their most capable hands.

The opportunity occurred for the acquisition of a portable X-ray apparatus, which proved most helpful in many cases and for which our thanks are due to the Royal Navy.

During the greater part of the period under review the C.E.P. consisted of 38 Officers, 16 Nursing Officers and over 600 other ranks—not one of whom could have been spared from an organization that had to be prepared to deal with any number of cases.

The largest number of cases retained over night was 1,200 but this number stretched resources to the absolute limit and to enable this number to be cared for additional accommodation and help was gratefully accepted from a nearby medical unit.

The normal capacity of the C.E.P. was 300 in buildings and 400 in tents, but on occasions this was not sufficient, there being as many as 30 more ambulance cars in the car park still awaiting unloading. In this case medical officers saw each case in the ambulances and hot tea was distributed—the ambulances then proceeding direct to the ship to unload.

It was early decided that, save in the direst necessity, loading would not be undertaken at night, and experience showed this a very wise decision.

The problem of feeding such varying numbers was very much easier than anticipated. Four hospital cooks R.A.M.C. carried out the whole of the cooking and rations were drawn on a steady basis of 350 patients per day, which balanced out remarkably well. During the major portion of the time "Compo" rations were in use, which rendered the problem more simple.

By the beginning of August it was apparent that the period of usefulness of the C.E.P. was drawing to a close—the increase of the number of casualties being evacuated by air, the expectation of deterioration of the weather owing to the approach of autumn, the increasing likelihood of a port being available in the near future and the number of hospital beds in the bridgehead having increased to the extent of permitting cases to be held up to seven days.

The decision was then taken to reduce the size of the C.E.P. so one F.D.S. and one F.S.U. were withdrawn on August 10, leaving the remainder to carry on until such time as their presence was no longer required.

This completed a phase in the evacuation of casualties which demonstrated the remarkable adaptability of units to circumstances and the ease with which units will work together with a common purpose and aim.

At all times the assistance given by all administrative medical officers under whose command we came was such as to make the work we had to do many times easier. The response to our request for extra assistance was always met to the limit of available resources.

The main difficulty at all times was that the flow of casualties to the C.E.P. was not regulated. Had it been possible to ensure that casualties started to arrive at the C.E.P. soon after first light and stopped by 18.00 hours a reasonably planned evacuation could have taken place.

The C.E.P. is essentially a cushion where cases can be held pending actual embarkation, and in an operation of this size required to be at least 600 capacity. Had it been possible to keep a constant flow many more ships could have been utilized and the overcrowding that was at times inevitable could have been avoided.

Finally, the work could not have been carried out without the absolute co-operation of all ranks and their willingness at all times to work many hours without rest, but with the utmost will and cheerfulness.

EMBARKATION OF CASUALTIES FROM A BEACH-HEAD.

AN ARTICLE BASED ON EXPERIENCES IN SICILY AND ITALY.

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INTRODUCTION.

In an amphibious operation the landing of all men and stores after the first assault flight is the responsibility of the Beach Group attached to the formation concerned. The medical element of the Beach Group is responsible for the early surgical treatment of casualties and for their evacuation by embarkation on to hospital craft. This medical element consists of a Field Dressing Station with one or more Field Surgical Units and, possibly, a Field Transfusion Unit. These units combine to open an Advanced Surgical Centre about half to one mile inland while the Light Section of the Field Dressing Station remains on the beach as a Beach Dressing Station. The F.D.S. is also responsible for finding an Embarkation Team to carry out evacuation. The prompt clearance of casualties in the early stages is essential, not only for the maintenance of morale but in order to keep vacant as many as possible of the limited number of beds available so that a sudden rush of casualties may be accommodated. Further, it must never be forgotten that unsuitable weather may make evacuation impossible for several days.

To enable this prompt clearance to be carried out a considerable amount of organization is necessary. No fixed drill can be laid down for circumstances differ in every operation and, although certain basic principles remain constant, the majority of factors vary so considerably that a special plan requires to be prepared in each instance. In making such a plan the following factors must be considered:—

(1) *The Number of Medical Units to be Cleared.*—In the early stages of an operation nearly all casualties are evacuated through the Advanced Surgical Centre of each beach. A few casualties, however, always appear at the Casualty Embarkation Point from other sources so that, even at this simple stage, it is essential to have clerking carried out at this point in order that proper documentation may be effected. Subsequently it may prove necessary to evacuate other medical units through this point, as other beaches may be found to be unsuitable and be closed down and eventually a port will be employed. Thus, in one case, this unit found itself responsible for clearing no fewer than eight medical units. In due course an Area medical staff officer takes over the duties of casualty embarkation.

(2) *Hospital Craft.*—The medical planning of the operation provides for the arrival off the beach at fixed times of hospital ships or carriers, usually the latter, which have a smaller capacity and a less specialized staff, being intended for short voyages only. Information about the actual arrival of these must be obtained by close liaison through the Military Landing Officer with the Senior Naval Officer Landing. Such craft may have to serve several beach sectors and an allotment of the number to be embarked by each sector, based on returns showing the number awaiting evacuation, is laid down by higher authority which has been previously informed of the capacity of each ship. It is worth mentioning here that stretcher cases for hospital craft are those which cannot be taken off the stretcher to walk or be assisted down to the lower decks.

Operational conditions dictate the distances at which the hospital craft lie off and the time for which they remain at anchor. Where heavy aerial attack may be expected they are obliged to lie well away from other shipping and usually sail well before dusk. These limiting factors demand an effective plan for smooth and efficient evacuation when the craft are available. Nevertheless, we strongly believe that, while patients may be *prepared* for evacuation, they must never actually be *moved* until the arrival of the hospital craft is confirmed.

When, owing to various reasons, hospital craft were not available off the Italian beaches, or when their capacity was not adequate to accept all casualties for embarkation, Landing Ships, Tank, were used for evacuation with considerable success for a short voyage of twelve hours. One hundred and fifty sitting cases could be taken in the troop spaces and 200 stretcher cases on the tank deck, though these were emergency figures, and instructions for their normal use for casualty evacuation limited the numbers to 120 sitting cases and 100 stretcher cases. As these craft were always urgently required and could not be subjected to unnecessary risk, they only beached for the minimum time and had to be loaded with the greatest possible speed. To enable this loading to be completed in the desired time of twenty to thirty minutes arrangements to load casualties were made, at the latest, when the L.S.T. beached and began to unload. In order to have the casualties at the beach ready to embark by the end of the short time taken for the L.S.T. to discharge its cargo, they had to be concentrated and ready to move. This was greatly facilitated by the use of Casualty Transit Area described below. Rapid embarkation was effected by driving ambulances on to the tank deck and unloading them there which, incidentally, offered the advantages of eliminating one handling of the patient and of avoiding the exposure of casualties to further wounding by A.A. fragments—a very great aid to their morale. The use of L.S.s.T. for this purpose was obtained by application to the Senior Naval Officer Landing or the Principal Beach Master. When they were so used it was necessary to detail a medical party consisting of 1 N.C.O. and 4 Nursing Orderlies to accompany the casualties, having with them the following equipment: 1 Surgical Haversack, 1 Shell Dressing Haversack, 2 Bedpans, 2 Urinals, Reserve Dressings, Hot Water Bottles (as many as possible) and Feeding Cups.

Priority 1 cases could not be embarked on L.S.s.T. as adequate facilities for their care could not be provided but these represented only a small percentage of the total to be cleared and evacuation by L.S.T. was eminently suitable for surgical cases in plaster and the majority of sick. After the first few days of the Anzio operation at least half the number of casualties evacuated were sick cases.

Replacements of stretchers and blankets could not be obtained from L.S.s.T. and arrangements had to be made for returning the number so lost to the beach-head by other means.

(3) *Transport to Casualty Embarkation Point.*—Only two ambulances are available from the F.D.S. and more must be supplied on a Corps basis. Sitting cases can be moved by truck. In early stages of the operation the Motor Ambulance Convoy cars usually attached to Casualty Clearing Stations may not have been landed, in which case divisional cars must be used.

(4) *Preparation of Patient.*—In view of the fact that considerable delay might occur before the embarkation of the patient, hospital evacuation officers should ensure that:—

(i) Patients are fed, given the opportunity to use a urinal or bedpan and *securely* wrapped as shortly as possible before being moved.

(ii) All plaster cases are particularly inspected.

(iii) Field Medical Cards are tied to the lapel of the sitting patient or stretcher handle of the stretcher case. Uniformity saves much time and makes the task of the E.M.O. at the port of disembarkation immensely easier.

(iv) All kit accompanies each patient. A.F. W.3042 (wounded man's kit label) should always be used.

(v) Red Cross Bags, if available, are issued.

They should further see that this preparation is complete by the anticipated time of evacuation, e.g. in transferring patients from beds to stretchers, and that sufficient personnel

are available to load ambulances with the minimum of delay. The last ambulance from each clearance must report as such to the E.M.O.

(5) *Documentation*.—As casualties travel by sea and may be embarked on various craft a rigid system of checking must be employed. For this reason a nominal roll from each evacuating medical unit is called for, to be delivered to the E.M.O. on the dock by the first ambulance. The preparation of this nominal roll may be considered extremely difficult but, if the system here described is adopted, it is not only easy but of great assistance to the evacuation officer himself.

In the medical unit a suitable number of large and conspicuous placards is provided, bearing a big letter "E" (one foot square). These are serially numbered and are kept in the reception department or evacuation ward. As soon as a patient is nominated for embarkation the N.C.O. in charge obtains one of these placards and enters the patient's name and ward on an evacuation list, kept at the same place, *against the serial number of the placard*. This is then placed beside the patient's bed and the serial number is marked conspicuously on the outside of the Field Medical Envelope (A.F. W. 3118A).

In this way a nominal roll is automatically prepared during the time prior to evacuation and the evacuation officer can readily pick out the cases awaiting clearance without having to consult all the Field Medical Cards in the ward. In addition, he can tally the names and the wards against the serially numbered nominal roll and can always readily discover the number awaiting evacuation.

At the Casualty Embarkation Point the E.M.O. can quickly check the name of the man, by observing the serial number on the envelope, on the nominal roll on which is marked the name or number of the craft on which he is being embarked. With a long list of names this obviates hunting for each individual name and saves much valuable time. On occasion, it is necessary during evacuation to add to the numbers to be cleared. In such cases supplementary nominal rolls must be sent to the E.M.O. Small numbers can usually be slipped in without difficulty but permission should be obtained to add more than four or five.

The E.M.O., on making liaison with the hospital ship representative, can help him considerably by giving the numbers of priority cases, officers and minor sick. The last may include cases of minor chronic ailments or venereal disease which can be accommodated on mattresses in corridors thus increasing the total number that can be accepted.

(6) *Casualty Embarkation Point*.—This is sited at a point on the beach or port to suit the Navy, after consultation with S.N.O.L., and is manned by the F.D.S. embarkation team. Clear signposting is essential with "IN" and "OUT" traffic signs.

It is very important that it be established early and that *all* cases are checked through in order that a *complete* record of evacuations is subsequently available.

Embarkation Team consists of: (a) Unit Stretcher Bearer Officer who acts as E.M.O. and must maintain full liaison with S.N.O.L. and P.B.M. *re* (i) arrival, position and length of stay of hospital ships; (ii) availability of small craft for evacuation; (iii) provision of L.S.Ts. if necessary. (b) 1 N.C.O. and 4 stretcher bearers. More stretcher bearers are desirable but cannot be supplied by the F.D.S. Naval personnel, hospital ship R.A.M.C., prisoners and casual labour may be available. (c) 1 Clerk:

Supplies.—The team is provided with a small amount of medical equipment, medical comforts and containers of hot tea. They also have bedpans, urinals and feeders for the occasion when they have to accompany casualties to the hospital ship. A stretcher and blanket dump is placed here to replenish ambulances and to receive the exchange stretchers and blankets returned from the hospital ship. The provision of ground sheets is recommended in case the weather should be inclement as patients have little or no protection from the elements while being transported from the beach-head to the hospital ship.

When the Advanced Surgical Centre alone is being evacuated, casualties are called forward for embarkation as and when required. When, however, several units are being cleared, it is necessary to avoid a large concentration of patients and ambulances on the beach or dock and a more elaborate system must be employed, involving the use of a transit area.

(7) *Casualty Transit Area*.—When a number of medical units have to be cleared through the same Casualty Embarkation Point casualties are called forward to a Casualty Transit Area situated within half a mile of the C.E.P. Liaison is maintained by D.R. and casualties are brought down to the C.E.P. in accordance with the rate of loading, thus avoiding any congestion and reducing to a minimum the exposure of the casualties to aerial attack.

The E.M.O. must be informed daily by an early hour of the casualties awaiting evacuation by each medical unit. These are called forward in these categories: (a) Priority stretcher cases—these must be loaded on hospital ships. (b) Non-priority stretcher cases. (c) Sitting cases.

All cases are checked by an Officer or reliable N.C.O. IN and OUT of the transit area so that the number still awaiting in the area is always known. Hot tea and some food should be available in case delay in embarkation occurs and latrines must be provided. It is desirable that the Light Section of the F.D.S. should be sited in the Transit Area to provide these services so that a compromise must be effected between the siting of the Transit Area and the B.D.S. Thus, if this can be arranged, a Medical Officer is always immediately to hand to see any serious cases in transit. A watch should be kept on all stretcher cases who may be delayed. By this system casualties for evacuation are always readily available so that L.S.T., in particular, can be loaded without delay.

(8) *Craft for evacuation from Beach-head to Hospital Ship*. (All estimates of turn-rounds assume that the hospital ship is lying one mile off.)

(i) *Water Ambulances*.—Each hospital carrier has six of these with a capacity of 7 stretcher cases or 20 sitting cases. Using them all a fair rate of evacuation is 6 to 9 loads per hour.

(ii) *Landing Craft Tank*.—These are only worth using when large numbers have to be cleared. Capacity is 100 stretcher cases and 100 sitting cases. Turn-round four hours. (This assumes five stretcher squads loading and unloading being carried out by hospital ship personnel.)

(iii) *Landing Craft Infantry*.—Capacity 40 stretcher cases and 60 sitting cases. The latter have to be able to walk downstairs to the troop spaces. Turn-round two and a half hours. (Assumes loading personnel as for L.C.T.)

(iv) *Motor Launches*.—Are unsuitable for this work being extremely difficult to load and having a small capacity (14 stretcher cases and 20 sitting cases). They have, however, been used with success to rush emergency cases to a hospital ship.

(v) *Dukws*.—These amphibious craft can carry 9 stretcher cases (3 on the floor and 6 across the thwarts) in good weather. Under such conditions they are particularly valuable in that they can transfer the casualties direct from A.S.C. to hospital ship comfortably and without handling. Some hospital carriers can lift them to deck level by davits. Up to 30 sitting cases can be carried but no real advantage is offered by their use in such cases and they should not be diverted from their operational role without greater justification. They are obtained on request from M.L.O. They are slow to load and the turn-round, from A.S.C., is about two and a half hours.

(vi) *Landing Craft Assault*.—Have a small capacity, are uncomfortable for the patients and have not been used.

(9) *Evacuation by Air*.—When a landing strip has been established and is being used by transport aircraft, casualties may be evacuated by them on their return flight. Immediate availability of the casualties for loading is essential. Patients are therefore transferred to a R.A.F. holding medical unit on the airfield to await clearance. It is desirable to evacuate relatively minor cases rather than to let space on the aircraft be wasted.

The following types of case are not suitable for air evacuation: Shock, abdominal and thoracic wounds, acute abdominal conditions, recent severe hæmorrhage, including hæmoptysis and hæmatemesis, gas gangrene, chemically gassed, lobar pneumonia, pneumothorax, angina pectoris, coronary occlusion (during first month of condition) and meningitis (during period of increased intracranial pressure).

DISCUSSION.

In order to ensure smooth evacuation great care must be taken to avoid a bottle-neck which can occur so easily as a result of shortages of manpower or transport at any link in the chain. Delays will always occur while the system is being evolved but close liaison with all units involved and immediate investigation of any delay will rapidly produce an efficient organization. In an emergency everyone will help the wounded. One example of this (before the organization had been perfected) was a case in which two L.C.T.s fully loaded with casualties had sailed into the anchorage to try and meet a hospital ship which failed to appear. On their return 212 stretcher cases and about 140 sitting cases were transferred to a L.S.T. in forty-five minutes. Naval personnel of all ranks have invariably proved particularly helpful.

SUMMARY.

The method of evacuation of casualties from a beach-head is described with particular reference to :—

- (i) Loading of hospital ships.
- (ii) The use of L.S.T. as a substitute, during the Salerno and Anzio operations.
- (iii) Documentation and organization of evacuation from the medical unit.
- (iv) The constitution of a Casualty Embarkation Team.
- (v) The use of a Casualty Transit Area and Casualty Embarkation Point.
- (vi) Types and capacity of craft employed.
- (vii) Air evacuation.

ACKNOWLEDGMENTS.

The authors wish to record their appreciation and gratitude for the instruction and help during operations given by Brigadier N. A. Croker and Colonel G. Anderton.

RECEPTION AND EVACUATION: NOTES ON ADMINISTRATIVE PROBLEMS ARISING IN A LARGE GENERAL HOSPITAL (1,500 BEDS) ACTING AS A CASUALTY CLEARING STATION.¹

BY MAJOR J. H. WARREN, *M.B.E.*,
Royal Army Medical Corps.

THIS hospital, since it arrived in this theatre of operations and, until recently, has been working as a C.C.S. during the Tunisian campaign with 1,200 beds and for the Sicilian and Italian campaigns with 1,500 beds.

In the battle for Tunisia it was the most forward of the larger hospitals, being situated on the main channel of evacuation by road and rail. Casualties were however mainly received and evacuated by road.

For the latter campaigns reception has been by road, rail and air whilst evacuation has been, with one or two exceptions, by rail and air.

Air convoys arrived without any prior warning and notification of other convoys, when received, was often only a short time before arrival.

In a period of six months this hospital dealt with 25,916 admissions and 25,741 discharges and transfers out.

It is not intended to include in these notes the problems associated with the feeding of large numbers of patients continually on the move, when it was seldom possible to even estimate the bed strength two or three hours ahead and when meals had to be provided almost continuously for twenty-four hours each day, but to give a short account of the system evolved for dealing with the clerical difficulties encountered in providing for a quick turnover on such a scale and at the same time keeping adequate records and coping with the innumerable returns that were always being compiled and forwarded.

The chief difficulty was lack of staff. One has only to compare the establishment of a C.C.S. and that of a General Hospital to realize the difference between the number of personnel allowed for the former and for this hospital working under conditions somewhat similar. It was, early on, found necessary to split the clerical staff into two twelve-hour shifts although these shifts have been of fourteen or fifteen hours' duration on many occasions.

RECEPTION.

"Transfers in" (convoys) and direct, i.e. local admissions, are treated separately.

A Medical Officer is employed permanently on reception duties. He has a Private clerk to assist in documentation and other duties in connexion with the direct admissions. The Hospital Office staff does all documentation of "transfers in."

A good approach to the reception tent is essential as experience has shown that when convoys arrive, as they have done at this hospital, two or three at a time, and each from a different source, they must be kept as separate entities to avoid confusion. This is more marked when evacuation is taking place as well.

The basis of all documentation at reception is the top of A.F.I. 1220, known throughout this hospital as an index card, and for this idea, although it is not used in quite the same way, we are indebted to another General Hospital serving in this theatre of operations. No wastage of the lower half of this Army Form occurs as it is used by the Divisional Officers and Pathological Laboratory for their card and index systems.

¹This General Hospital acting as a Casualty Clearing Station has worked out a method of documentation using index cards made from the upper half of A.F.I. 1220 in place of A.F.W. 3210 normally used in a Casualty Clearing Station.

Though this method is not in accordance with the established procedure yet it may be held that the peculiar circumstances in which this unit was placed, and the enormous number of short-term cases with which it had to deal, justified this departure from the official system.—ED.

Divisional Wardmasters keep a running bed state by wards. This is consolidated by divisions on a blackboard in the Registrar's office and is telephoned to higher authority at frequent intervals throughout the day.

On arrival of a convoy, "C" (in morse) is blown on a whistle throughout the hospital area. All available personnel, i.e. batmen, nursing orderlies off duty, etc., then report to the reception tent either to be utilized as stretcher bearers or as guides. Divisional wardmasters, with their bed states, and hospital office clerks also report.

Patients are examined in the ambulance cars by the reception officer who calls out to the wardmaster the preliminary diagnosis. The wardmaster concerned marks on the stretcher, in chalk, the ward to which the patient is to be taken, at the same time deleting an available bed in that particular ward on his bed state. Wards are allotted for specific complaints, i.e. burns, fractures, malaria, dysentery, isolation, etc., and it has seldom been found necessary to move a patient from one ward to another due to fault on the part of those working at reception.

The patients in the ambulance car having been seen, the reception officer proceeds to the next car and his place is taken by a clerk who obtains from each patient, or from the Field Medical Card, and enters on an index card the regimental particulars, force in which serving (M.E.F., C.M.F., Canadian, etc.), religion, preliminary diagnosis and ward to which proceeding. Whilst this is being done a representative of the Quartermaster's department completes in duplicate a list of items that will be left in the wards with the patients, i.e. pyjamas, Thomas splints, etc., giving one copy to the driver and retaining the other.

An ambulance car load having been completed a guide and stretcher bearers are detailed by the Reception Wardmaster and the ambulance car proceeds to the respective wards and unloads its patients.

The driver then leaves the hospital by an "out" road, calling at the Quartermaster's dump near the exit where he is issued with equipment in accordance with the list previously handed to him.

The exchange of equipment may vary according to the type of convoy received.

(a) *Road*.—As ambulance cars nearly always return to the area of the hospital from which they collected the patients exchange was carried out as above and the forward hospitals were not denuded of equipment.

(b) *Ambulance Train*.—Exchanges were made direct between the Quartermaster and O.C. Train.

(c) *Air*.—Exchanges of equipment were not practicable. As far as this hospital was concerned, however, evacuation by air prevented stocks accumulating.

In cases where a patient is found to be in urgent need of treatment the Reception Officer modifies the above system in order to ward the man as soon as possible.

A convoy of 200 can be documented and warded within two hours.

On the completion of the convoy by the Reception Officer, the index cards are taken to the A. and D. clerks, sorted and the necessary entries made in the A. and D. books, the provisional diagnosis being entered in pencil, later in ink when confirmed. On each card is entered the serial number from the A. and D. books and they are then passed over to the returns clerk for the compilation of A.F.W. 3034 and other returns. These cards are then filed alphabetically in a "patients in" box and are extremely useful in all enquiries concerning men in hospital.

Wardmasters then report bed states and a check is thus made on the number of index cards handed in. It is improbable that the documentation of a patient can therefore be missed.

Direct admissions are similarly documented.

EVACUATION.

It was found very early on in the campaign that a system would have to be devised that would ensure a running state of patients, suitable for evacuation, not only by numbers and

type of cases but also by name and location in the hospital. In many cases very short notice of an evacuation was given and, whilst this may not matter much when the numbers to be transferred are small, time means everything when possibly 400 to 500 are to be evacuated in the space of a few hours.

The following pro-forma was produced and distributed to the wards. It is self-explanatory :—

EVACUATION PRO-FORMA.

No. Rank. Ward.

Name

Unit

Diagnosis

Med./Surg./Lying/Sitting/Si./Di.
(Delete where not applicable)

Date

M.O. i/c Case

As soon as a patient is fit to travel the M.O. i/c case completes a pro-forma for him and hands it in to the hospital office. The pro-formae of cases requiring urgent evacuation are marked " Priority." In this office they are sorted into Medical and Surgical, Lying or Sitting, and filed into pigeon holes under the Force—British Army, Canadian Army, R.N., R.A.F., etc.—by the evacuation clerk. A separate pigeon hole is used for special cases, e.g. Air Priority, Maxillo-Facial, Head Injury, etc.

At the same time a running evacuation state is kept and for this purpose a cleaned X-ray film superimposed on the following chart and marked with a grease pencil has been found most suitable.

		EVACUATION STATE.			Time		
Date							
		Lying	Surgical Sitting	Air	Lying	Medical Sitting	Air
British Army	A						
	B						
Canadian Army	A						
	B						
Royal Navy	A						
	B						
Royal Air Force	A						
	B						
Allied	A						
	B						
Merchant Navy	A						
	B						
U.S.A.	A						
	B						
P.O.W.	A						
	B						
V.D.	A						
	B						

Totals :—A—Officers ; B—Other ranks.

The pigeon holes conform more or less to the above divisions and it will be seen that the personnel, type and class available for evacuation can be given at any time.

The pro-formæ are filed in the respective pigeon holes by date, i.e. the last received are at the back.

On notification being received of an evacuation, say by ambulance train with a capacity of 90 lying and 110 sitting and proceeding to a destination to which both British and U.S.A. can be sent, the required number of pro-formæ including "Priorities" are removed from the pigeon holes and from them eight copies of a nominal roll are compiled.

These copies are distributed as under :—

Reception Wardmaster for O. i/c Ambulance Train (or Airport), or in case of Road Convoy O.C. Receiving Hospital, 3 copies ; A.D.M.S., 1 copy ; O. i/c Surgical Division, 1 copy ; O. i/c Medical Division, 1 copy ; O. i/c Reception, 1 copy ; File, 1 copy.

The roll includes all particulars shown on the pro-forma except the date and the name of the M.O.

All concerned are warned by means of the following as to the time the evacuation will take place and the necessary transport ordered accordingly :—

EVACUATION OF PATIENTS FROM.....GENERAL HOSPITAL BY.....
ON.....(Date)

(Initials)

To : O.C.
O. i/c Surgical Division
O. i/c Medical Division.....
O. i/c Reception
Q.M.
Matron
R.S.M.
Steward

Evacuation will take place at hrs. to-day.....

British Officers.....
British O.R.s.....
Colonial.....
P.O.W.
Others

Rations will/will not be required for the journey.

Major R.A.M.C.,
Registrar General Hospital.

On receipt of their copies of the nominal roll, the divisional wardmasters inform the wards of the patients to be evacuated, time to be ready and alterations if any; these being notified to the hospital office.

As a general rule loading is timed to commence at the hospital about half an hour before the first ambulance car should leave and it has been found that patients for a train, of the capacity mentioned, can be checked and clear of hospital within ninety minutes.

When evacuation is due to commence the following personnel report to the Reception Tent : Reception Officer, R.S.M. (who is responsible for stretcher bearers), Divisional Wardmasters, Evacuation Clerk, Q.M. Representative.

On arrival of the transport, that required for stretcher cases proceeds, together with the necessary stretcher bearers, to the required wards under the instructions of the divisional wardmasters and loading begins. Sitting cases report direct to Reception and are loaded there.

Each ambulance car reports to Reception before leaving the hospital and patients are checked off by the Reception Wardmaster from his nominal roll. He ensures that medical documents and X-ray films have been received from the wards and that each patient is in possession of his kit. Rations are distributed when necessary and, where the supply allows, cigarettes are given out by the B.R.C.S. representatives.

The representative of the Q.M.s department records any clothing or equipment that is with the patient and, when possible, exchanges direct with the O. i/c Train or receiving hospital ; otherwise it is vouchered over to the receiving hospital.

Unfortunately many evacuations take place in which the receiving hospital is not known and this has proved, to this hospital, the only snag from the point of view of equipment, follow up of patients' mail, queries, etc., in an otherwise smooth running system of evacuation.

Of the three copies of the nominal roll prepared for the O. i/c Ambulance Train, etc., two copies are given to the driver of the first ambulance car leaving in order that patients may be checked off at his end whilst the third copy, which is amended to include any last minute alterations, is given to the driver of the last vehicle. The copy issued to the O. i/c Reception is similarly amended and handed in to the hospital office.

A similar organization is adopted for convoys out by air or road.

On receipt of the nominal roll in the hospital office the index cards are removed from the "patients in" box and handed over to the A. and D. clerks. It is then an easy matter marking the patients out in the A. and D. books as each card bears the serial number of the entry in the books. The disposal of the patient is entered both in the books and on the card. The cards are then handed to the return clerks who from them complete their A.F.W. 3034. They are then filed alphabetically in the "patients out" boxes and the "convoy out" is complete.

It will be seen that the index card is of inestimable value. It is the document by which the patient is entered in and out of the A. and D. records ; it shows the location of the patient whilst in hospital and the disposal of the patient when he leaves the hospital.

Although the numbers reach a large figure after the hospital has been working for some weeks they are well worth keeping ; the time saved in tracing queries arising, often after the lapse of months, is considerable.

The above system has been evolved from trial and error. As far as is known no instructions exist to cater for a General Hospital placed in similar circumstances. It has been modified occasionally according to circumstances, but it has stood the test of time and it is hoped that these notes on its working may be of some assistance to other medical units starting as "green" as this one did.

I wish to thank Colonel W. Campbell and Colonel R. I. Poston for permission to forward these notes.

INFECTION IN WAR WOUNDS.¹

BY LIEUTENANT-COLONEL G. A. G. MITCHELL,
Royal Army Medical Corps.

THE percentage of infected wounds is much higher in military than in civilian practice, due mainly to circumstances beyond medical control. Many factors account for this.

(1) The average battle wound is more severe than the average civilian casualty. This is exemplified by the following figures. In one series of 250 consecutive patients admitted to an orthopædic centre in the M.E. during an offensive there were 197 battle casualties and 53 others (mainly the result of motor and football accidents). Of the battle casualties 194 had open bone or joint injuries, but only 3 of the others had injuries of this type.

(2) The proportion of open or closed fractures and joint injuries is much higher in battle wounds, as the above figures show, and the degree of bony and soft tissue damage is often extensive.

(3) The soldier's skin and clothing are often very dirty, due to lack of water or washing facilities.

(4) Penetrating and perforating wounds of the body cavities are common, with all the attendant risks of infection from various parts of the alimentary or respiratory tracts.

(5) Foreign bodies often lodge in the wound and may not only introduce infection but favour its persistence.

(6) Sometimes, though rarely, the foreign body may be irritant in itself, e.g. fragments of incendiary bombs.

(7) The victim may have had his resistance sapped by a period of severe physical and mental strain, he may have been exhausted by exposure to excessive heat or cold, and under the stress of battle (especially in the desert) his food and water supplies may have been erratic. Such factors are infrequent in civilian casualties.

(8) Immediate treatment on the battlefield is seldom possible and, even when it is, the M.O. is working under conditions which cannot compare with those in a civilian casualty department.

(9) In certain theatres of war the wounded may have to be transported many hundreds of miles over difficult country before they reach hospital. Delays of one or two days before the patient reached the first field unit possessing reasonable surgical facilities were not uncommon in the desert and the complete journey from front to base might take six to twelve days. The adequate rest, attention, chemotherapy, etc., easily obtainable in a civilian hospital are difficult to obtain under such circumstances.

(10) During a battle medical officers and orderlies are usually working under great pressure, often handicapped in the forward areas by a shortage of instruments, sterilizers, linen and even water. The maintenance of strict asepsis under such circumstances is impossible.

(11) The average ward filled with battle casualties has a higher proportion of septic cases than the average civilian surgical ward. This increases the risk of cross infection, a risk still further increased by the fact that tents and huts are less easily cleaned than ordinary wards, sterilizing facilities may be meagre, and dressings must at times be delegated to partially trained personnel.

(12) In certain areas the prevalence of flies is an ever-present menace.

This list could be extended but the factors mentioned do explain why infection in war wounds is so common and show that most are beyond medical control.

It would be a waste of time to describe academically the appearances and pathological changes presented by infected war wounds because they and the general toxic and infective complications that may result do not differ materially from those due to other accidents. Only for the reasons stated the proportion of intrinsically serious lesions is higher and the

¹ A lecture delivered at the British Postgraduate School, London, on March 20, 1944.

incidence of infection greater. Every degree may be seen from the clean bullet wounds with no sepsis to the most severe mine, shell or bomb wounds with gross infection, marked general intoxication and possibly septicæmia or pyæmia.

The bacterial enemies remain the same in war as in peace, with streptococci and staphylococci leading the field. The following figures lend emphasis to this assertion. They refer to a series of 100 consecutive casualties treated in a M.E. Orthopædic Centre in 1942. The date is mentioned because the wound flora have varied from time to time and whereas organisms of the *Streptococcus viridans* group were commonly found in the winter of 1940-41, they later became much less common. The table merely gives an indication of the incidence of various organisms in 100 cases. Actually the infection was mixed in all except 6 cases, the most common combined infection being with streptococci and staphylococci, although other organisms were often present with these in the same wound.

Streptococci	..	..	68	per cent
Staphylococci	..	..	58	"
Clostridia group	..	..	28	"
<i>B. pyocyaneus</i>	..	..	16	"
<i>B. proteus</i>..	..	..	14	"
<i>B. coli</i> ..	..	..	6	"
<i>B. subtilis</i>..	..	..	4	"
K.L.B.	..	..	1	"

These figures were derived from the analysis of reports on swabs and smears taken when the infection was active, usually soon after the patients were admitted and anything from three to fourteen days after wounding. Material obtained from healing wounds showed a much lower incidence of coccal infections, a disappearance of anaerobes, and a higher percentage of *B. proteus*, diphtheroids and other less pathogenic organisms. The predominance of streptococci and staphylococci will be noted, and about 70 per cent of the former and 30 per cent of the latter were hæmolytic in type. Many of the infections were severe, possibly due more to extensive tissue damage rather than to the virulence of the organisms.

The following figures (kindly supplied by Captain C. N. Robinson) referring to 174 burns cases are given for comparison. There are no great differences but, as most of the burns were "older" than the orthopædic cases, there is a shift towards the less pathogenic types.

Streptococci	..	..	51	per cent
Staphylococci	..	..	60	"
Diphtheroids	..	..	22	"
<i>B. proteus</i>..	..	..	16	"
<i>B. coli</i> ..	..	..	14	"
<i>B. pyocyaneus</i>	..	..	5	"
K.L.B.	..	..	3	"
<i>B. subtilis</i>..	..	..	1	"

The absence of any mention of anaerobic types does not necessarily mean they were absent; in the desert hospital where these burns were treated there were no laboratory facilities for anaerobic work.

It has been stated that streptococcal wound infections occur after the patient arrives in hospital but this is not true in battle casualties. Thus, in one group of 14 patients whose wounds were swabbed within two hours of admission, 8 were already infected with streptococci; and in another similar series of 18 patients, 10 had streptococci in their wounds on admission. None of these men had been in a hospital in the ordinary sense of the term but all had passed through a minimum of three Field Medical Units and may have collected the infection there.

Streptococcal infections usually prove more troublesome in the earlier stages and are more liable to produce signs of general intoxication, while staphylococci are more persistent and difficult to eradicate. Indeed, it is true to say that the latter are present in a high proportion of the genuinely chronic wounds and, until the recent introduction of more potent bacteriostatic agents or the use of older antiseptics in newer ways, their eradication presented a difficult problem for the surgeon in a hospital treating many severe battle casualties. The relative ease of dealing with streptococci is a tribute to the efficacy of the sulpha compounds, although a certain proportion of the organisms are apparently insensitive *de novo*, while others acquire a tolerance through improper use of these potent therapeutic weapons. Needless

to say in making these remarks one is assuming that all necessary surgical measures have been employed, such as the provision of adequate drainage, the removal of irritants and the extirpation of necrotic tissue and sequestra. Lavish chemotherapy will not purchase an indulgence to expiate surgical sins. One has seen tragedies due to the neglect of elementary surgical canons—a hand ruined by too tight packing of a palmar wound resulting in widespread infection and sloughing of tendons; a gangrenous foot due to swelling within an unsplit plaster applied for infected compound fractures of the leg bones; a fatal gangrene of the perineum and genitalia due to sepsis supervening on an undetected urethral laceration with extravasation; gross pelvic and gluteal cellulitis with repeated secondary hæmorrhages due to ignorance of the fact that an apparently insignificant buttock wound may be associated with visceral damage; a severely lacerated and contaminated leg encased in a complete plaster which obscured gas gangrene which almost cost the patient his life—and several other tragedies or near tragedies due to too vigorous applications of ordinary or plaster bandages over infected lesions. Such methods, well meant but ill-applied, may transform a minor infection into a major disaster. Our methods of defence have improved and multiplied but the offensive power of our microscopic enemies has not decreased and they are quick as ever to profit by therapeutic blunders.

The bacteriologist can provide invaluable help yet undue emphasis must not be laid on laboratory findings. Thus a report that hæmolytic streptococci are present in an apparently clean, granulating wound will abolish thoughts of an immediate skin graft from the mind of the discerning surgeon but some healing wounds still provide material from which pathogenic bacteria may be grown almost up to the last day. Many of these may be of relatively low virulence but occasionally even hæmolytic streptococci and staphylococci persist in this way and critical study of the actual wound provides the only reliable test of progress. There is a tendency to believe the *B. proteus* and *B. pyocyaneus* are almost innocuous and, once they alone remain, healing will soon follow. Undoubtedly healing often occurs without undue delay in their presence but experience of large numbers of wounds has shown that intractable ulceration may persist when there is no discoverable cause for chronicity such as a foreign body or sequestrum and where repeated examinations only reveal the presence of these organisms.

The cautious assessment of laboratory reports is especially necessary when considering the Clostridia group. In the above-quoted orthopædic series these organisms were present in 28 per cent of the wounds but only one patient had true gas gangrene and he might have escaped this complication if his grossly lacerated and contaminated leg had not been encased in an unsplit, unpadded plaster, with consequent swelling and interference with the circulation. In over three and a half years engaged in active war surgery one has seen only 14 genuine cases of gas gangrene (not all personal cases), and not a single case of tetanus. The presence of Clostridia group organisms should never by itself lead to a diagnosis of gas gangrene. The diagnosis can only be based with certainty on the clinical appearances and examination of excised portions of the affected muscle. Nor should undue reliance be attached to the claim that radiological demonstration of gas in the injured tissues of a limb is an infallible indicator of this condition. One has seen several cases where X-rays revealed gas in the muscles adjacent to the wound but where there was no clinical evidence of gas gangrene and where the bacteriologist failed to isolate anaerobes. Air may be drawn into the tissues by the actual missile or may be forced into the wound by the blast of the explosion. Moreover other types of organisms may also produce infections associated with gas formation and of these the most interesting and serious are due to anaerobic streptococci. One has seen five such cases. The original wounds in all five were of the punctured variety and in all a brawny induration developed, with coppery discoloration of the overlying skin and a tendency to blistering. In one patient extensive gangrene of the skin resulted and in another discrete areas of gangrene occurred. In the fully developed state the patient looked and felt ill, he was apprehensive and sometimes delirious, he complained of a dull throbbing or constant aching in the affected parts and the pulse rate was occasionally elevated out of proportion to the temperature. The response to chemotherapy was not marked and after a variable time crepitation might be felt and radiographs showed small pockets of gas in the tissues, most com-

monly in the area beneath the deep fascia. On incision the superficial and deep fascia presented a curious brownish-green discoloration, capillary bleeding was minimal and the deep fascia and intermuscular planes appeared swollen and almost slimy in consistence. A musty odour was apparent and the exudate was serous and not frankly purulent. The muscle fibres, however, apart from a slight pallor, appeared to be largely unaffected and contracted vigorously when irritated while microscopic examination of excised portions of muscle showed no *Clostridia* group organisms and no evidence of gas gangrene. Cultures from the exudate and fascia revealed the presence of anaerobic streptococci. Three of the cases did well following free incisions, removal of necrotic tissue and local and general chemotherapy but two developed toxic hepatitis and died. One of these cases may be quoted :—

He had a small penetrating knee wound and a comminuted fracture of the lower femur produced by a shell splinter. He developed a widespread brawny œdema of the thigh, which spread into the abdominal wall within thirty hours of wounding. The overlying skin became brownish, blistering appeared, and later small patches of gangrene developed. At first apprehensive and anxiously voluble, his condition deteriorated rapidly and he passed into a state of low muttering delirium. The infection appeared to be yielding to widespread incisions, blood transfusion and a " blitz " course of chemotherapy and, for two days, his general condition was much improved. But about the fourth day signs of acute hepatitis developed, possibly due to a combination of factors—severe toxæmia, transfusion and chemotherapy—acting on an overburdened liver, and he died six days after being wounded. Blood cultures were negative.

Infective war wounds, like any others, resolve, extend or become chronic. Those undergoing resolution require no special comment. Considering the severity of many wounds and the difficulties surrounding early treatment, cases with spreading infection or septicæmia were almost surprisingly few in the M.E.—a tribute both to the excellence of the work performed by forward medical units and possibly also to the efficacy of chemotherapy. Patients were occasionally seen, however, where the severity of the general symptoms suggested septicæmia rather than intoxication but where repeated blood cultures gave no growth. It is possible that the concentration of sulphanilamide in the blood was sufficient to inhibit bacterial growth and that in at least some of these cases septicæmia did exist. Pyæmic manifestations were rare, but abscesses in the associated lymphatic glands not uncommon. Spreading infections along fascial planes and beneath muscles, as in the thigh, were also not uncommon and the deeper collections might be missed unless the possibility of such extensions was borne in mind.

Every general hospital with many casualties always had its quota of chronic cases. The majority were men with wounds of the extremities, because a much higher proportion of these survived, but naturally a number of those with wounds of the head, chest or abdomen also entered the chronic phase. For example, buttock wounds complicated by a rectal injury were notoriously slow in healing. Obviously the decision as to when an infected wound becomes chronic must be arbitrary but any wound still open after two months would be regarded as chronic by most surgeons and some, basing their opinion on civilian standards, might well choose an earlier date. No wound should be claimed as soundly healed unless it is completely epithelialized and shows no residual evidences of inflammation likely to lead to further breakdown. The possible fallacies regarding the latter point, however, are well known when dealing with any lesions involving bones.

Study of a series of 63 compound fractures sustained in battle provided the following figures :—

	Total	Wounds unhealed at 2 months	Wounds unhealed at 3 months
Femur	11	3	2
Tibia and fibula .. .	24	6	3
Tarsus and metatarsus .. .	9	6	5
Humerus .. .	8	2	1
Radius and u.na .. .	6	2	1
Carpus and metacarpus .. .	3	2	—
Scapula .. .	2	1	—
	63	22	12

These figures show that approximately 33 per cent of the wounds were still unhealed at two months but in three months the number had fallen to 19 per cent largely because the removal of sequestra in 7 cases led to healing of a persistent sinus. The slowest to heal were those involving bones of the feet. The majority of these were the sequel of mine explosions and most were heavily contaminated and contained multiple foreign bodies.

The following figures obtained from the study of 381 consecutive cases of burns were supplied by Captain C. N. Robinson. The term "recent" means that the burnt patients came under his care within forty-eight hours of sustaining their injuries, whereas "old" means that they did not reach him until after two days. In fact the average time interval in the "old" cases was twenty days and, during this period, a wide variety of treatments had been employed. After admission all cases were treated with Robinson's triple-dye-soap mixture. The table shows clearly the delaying action of infection on healing time and also how certain areas such as the face and upper limbs heal more rapidly than the lower limbs irrespective of the presence or absence of infection.

AVERAGE HEALING TIME OF BURNS.

	"Recent" first and second degree	"Old" infected first and second degree	"Old" third degree (or more)
Face	10 days	21 days	32 days
Upper limbs..	13 "	26 "	38 "
Trunk	12 "	25 "	54 "
Lower limbs..	25 "	40 "	81 "

The causes of chronicity in war wounds are many and various but possibly the two chief ones are the gross and extensive nature of the original injury and the fact that infection is often well established before the surgeon has a chance to prevent it. The former cannot be controlled but much may be done by more rapid methods of evacuation and better chemotherapy to overcome the latter. The newer drugs combined with judicious surgery hold out high hopes of improvement in this respect. Needless to say there are other factors which may cause chronicity. The area of skin loss may be so great that healing by natural processes must inevitably be a lengthy process. The patient may be debilitated and his resistance undermined by strain, exhaustion, loss of blood or a virulent infection. He may have suffered from lack of proper food and water and in a few there may be some constitutional disease such as nephritis which reacts unfavourably on his reparative powers. The position, and especially the combination of wounds in awkward situations, may hamper both nursing and dressing and render the prevention of reinfection difficult, as in wounds of the perineum or buttocks. Sometimes the nature of the infection plays a part, as in wounds harbouring K L.B. (particularly if this fact is not detected), and certain strains of staphylococci seem to favour chronicity. Others have claimed that irritation by sand or prolonged exposure of the skin to intense sunlight also predisposes to extension and chronicity and that this explains the prevalence of so-called "desert sores" following minor scratches and abrasions. And lastly a certain number become chronic because of inadequate or improper treatment. Thus, errors in dressing technique may lead to constant reinfections and the failure to secure proper drainage, or to remove sequestra, etc., may prevent healing. Other wounds fail to heal because the dressings are irritating or because some agent is used over such prolonged periods that the organisms develop an immunity to it. In this respect sulphanilamide and vaseline gauze must be one of the most misused materials in the whole realm of surgery, and one has seen cases with indolent ulceration and pale unhealthy granulations where this dressing has been used continuously over periods of two or three months. Other applications such as the flavines and eusol are also commonly misused in a similar way, and there seems to be little doubt that prolonged use of occlusive dressings may delay rather than hasten healing in certain cases.

I wish to thank Colonel J. C. Coutts, Officer Commanding a General Hospital, for permission to forward this article, and Captain C. Neville Robinson for kindly providing me with figures relating to his burns cases.

WAR YEARS IN INDIA—IRAQ TO ITALY.

BY A MEMBER OF QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

SEPTEMBER 3, 1939, found me in Kasauli, one of the many delightful hill stations of Northern India, a place so attractive and peaceful that it was difficult to credit a second World War was beginning, even with the wireless announcements reminding us of the fact from time to time.

For two years I divided my time between the plain and hill stations of the Punjab longing, like everybody else, to be sent on active service, listening to the wireless accounts of the tragedies of that period and feeling that our families at home were getting more of the knocks of war than we were. At the same time we realized that the work in India, though on the surface less spectacular, was growing daily in importance. Practically all the British personnel were removed from our hospitals and their places taken by Anglo-Indians, all of whom had to be trained as quickly and efficiently as possible into useful members of the R.A.M.C. Members of the Auxiliary Nursing Service, India, also came to help us and to receive instruction. At times we gave lectures to Indian orderlies from the local Indian Military Hospital where no Sisters were employed and, personally, I found them all intensely keen, many very intelligent.

September, 1941, I was recalled by telegram from leave in Kashmir and, thirty-six hours after returning to my station in Ambala, was reporting at the dock side in Bombay, *en route* for overseas. I now found myself on a cargo boat which was taking "details" to Iraq. Amongst them were several British Sisters returning to their parent unit, a General Hospital. Six other British Sisters, eight Sisters of the Indian Military Nursing Service, and myself, were known as "The Orphans," since nobody knew to whom we belonged or where we were going. On arrival at Basra we were informed that we were the Nursing Staff of a Combined General Hospital and a day or so later found ourselves *en route* for Baghdad.

Baghdad has always given me the impression of being an island standing alone in the middle of the ocean only the sea is of sand; you can travel for miles in any direction and see nothing but desert.

Everyone has heard of the "Thief of Baghdad." We discovered that he has hundreds of descendants! The Baghdad Iraqi, like most town Arabs, is out to "do" his own grandmother and, as we couldn't claim even this relationship, we didn't stand a chance!

The prices in most of the shops were impossible and we did not find the attitude of the "man in the street" too courteous. A trial "black-out" took place soon after our arrival but it proved such a godsend to the local gentry, who took the opportunity to murder and steal with great gusto, that it was thought that even a bomb might cause less damage!

The hospital was a tented one of, nominally, 600 beds (we sometimes had nearly double the number of patients) in 100-bedded sections spread well apart, one section British and five Indian. The tentage was painted a reddish-brown as camouflage. Alas! Later, when "the rains came," the camouflage "came off" and descended in drips from unexpected angles on to us and the patients till we looked somewhat like clowns in a circus!

The hospital was already working, and at great pressure, when we arrived, owing to a tremendous influx of malaria. The Matron of another General Hospital (not then functioning) and two Sisters loaned from other hospitals were helping the men to stem the tide when we relieved them. Our own Matron did not join us till a few weeks later. It was a new experience to me to work in a hospital with Indian patients and run almost entirely by Indians. The Indian, on the whole, makes an ideal patient and is very grateful for anything done for him. The greatest difficulty was in overcoming the prejudice in allowing Sisters to go on night-duty. "It is your sex; it is your sex," I was told patiently, over and over again, to

which I replied (less patiently I fear as time went on) that, though I could not be held responsible for the unfortunate fact of our sex, I definitely was for the nursing of the patients and must insist on having a Sister in charge of any ward, both day and night, where there were very ill men. On the arrival of the Matron, I returned to my normal work in the Operating Theatre.

We were very full all that winter, an exceptionally severe one. Large convoys came down from the north, scores of Indians falling victims to frost-bite owing to the unusual conditions ; many losing their toes, a few their limbs. They also seem very prone to " chest " conditions and, as they appear to share a child's desire to play with fire, some wards were always filled with burns. Accidents were very common.

We will always remember, with gratitude, the help of the British residents of Baghdad. Without exception, from the British Residency downwards, all the wives and families took one or other of the local British and Combined General Hospitals under their wing. They organized and ran libraries for the patients, coming round the wards themselves twice a week to distribute and change books. They brought special delicacies to tempt the very sick and many comforts that make " that little bit of difference " to an ill man. They made dressings and some helped in the actual ward work at a time when " that extra pair of hands " meant so much. At Christmas they saw that each man had a " stocking," sent a lot of Christmas fare, and supplied entertainment for the men. To ourselves they extended a welcome that will make the majority of us remember our days in Baghdad as very happy ones.

PERSIA—(TEHERAN AND AHWAZ).

In the Spring of 1942, the Russians began releasing thousands of Poles, men, women and children, across the Caspian Sea, into Persia. These unfortunates arrived in a pitiable condition, the majority showing the effects of several years of life under bad conditions, many of ill-treatment. Hundreds were stricken with typhus, many died on the road, others survived a bare few hours after admission to hospital.

The Combined General Hospital, the first hospital to arrive in this area, worked in tents on a small stretch of desert about four miles out of Teheran in order to prevent the spread of infection. They bore the brunt of the typhus epidemic. A Matron and nine Sisters, including myself, came up from Iraq to join an Indian General Hospital and were given a site immediately adjoining. The Matron and Sisters of the Combined General Hospital were more than kind to us on arrival. In spite of their already heavy work, they provided meals for us for the first two days till our own cookhouse was in a condition to function. Needless to say, several of our Sisters gave them assistance in their wards till our own hospital was in working order. All those on duty in the typhus wards wore white pyjama-suits over their clothes, tied at the waist, wrists and ankles, their heads swathed in a white cloth, to afford protection from lice. The number of these people that recovered under proper treatment was especially gratifying when one considered the state that many of them were in before the typhus attacked them.

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We were truly a cosmopolitan outfit—British Sisters nursing Poles, in a purely Indian Hospital, in the middle of Persia. The Medical Officers all spoke English, of course, and we had the odd Anglo-Indian orderly ; otherwise the language situation was truly comic. It is extraordinary, though, how quickly one can get used to grasping the " sense " of what people are trying to say. We had several Polish A.T.S. working in the wards. Though completely untrained on arrival, most of them proved very good and one or two of them understood a little French which was a great help.

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WAR YEARS IN INDIA—IRAQ TO ITALY.

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go round on night-duty and find a few patients missing ! They would return some hours later (often rather the worse for wear) and smile on us as though they had done nothing unusual !

Our batmen were an education to us in themselves. The majority of them had obviously been living primitively in the jungles of India until only a few weeks previously. Several appeared to understand no known language, others had never seen a white woman before and were obviously reluctant to work for one. However, with perseverance, a little weeding-out and the services of the much harassed Lance-Naik in charge, we managed to get some idea of work into them.

Beyond our little patch of desert, where it grew increasingly warm and we had a mild sandstorm every evening for a month, the country was quite lovely. In May the snow still lingered on the hills yet wild tulips stood up out of it on the lower slopes. One could drive far out into rural districts that reminded one of home, little streams of ice-cold water winding between green meadows decked with many of the English countryside flowers.

Teheran itself is a well laid out city, nice wide streets, with trees and buildings both pleasing to the eye and suitable to the climate. The shops, unfortunately, were filled with the usual robbers ; for instance, a pair of stockings one would blush to be seen giving away to a tramp cost £3.

I was one of the Sisters fortunate enough to be present at the presentation held on the occasion of the Duke of Gloucester's visit to the British Legation. The Legation stands in cool, green surroundings and we were very kindly allowed the use of the swimming-pool, a very real joy as summer advanced.

In July of 1942 I was sent as Acting Matron to a Combined General Hospital in Ahwaz. The hospital was a small one, consisting of 100 British and 100 Indian beds. The main hospital was accommodated in a school building with a few tents to cope with any overflow. There was a special Heat-Stroke Centre built underground exactly opposite the main building. This consisted of two rooms, one of which had the air-cooler working almost continuously and stored large stacks of ice to deal with the extreme cases. Immediately opposite was another ward into which the patients were moved as soon as they had sufficiently recovered until such time as they were considered fit to stand the much warmer atmosphere of the ordinary wards. Before I left, other underground wards were being added so that, in the next hot season, patients could be kept below for a longer period, and thus lessen the risk of relapse. I had met the odd "heat-stroke" before but never had I come across them in such numbers. The wards, particularly those of the British Section, were filled with practically nothing else. It was impossible to distinguish between the very ill and the "not so bads" on admission. Often a man would come in with apparently very few symptoms, only to be discovered a few hours later semi-delirious with a temperature of 108° F. So it was a case of watching every one all the time.

The Sisters and Orderlies worked splendidly for off-duty was scarce over the bad patches and several of them went down with Sand-fly Fever and a mild form of Dysentery. I was fortunate in having spent the early summer in the comparative coolness of the North but the majority had had several weeks of it before I arrived. We also had three members of the Auxiliary Nursing Service, India, on the Staff. Although I knew they must have been used to heat of a kind in India and, of course, I always saw they took adequate off-duty, they all seemed too young to me for such drastic conditions. The temperature had often touched the 130° F. mark and, for weeks on end, never fell below 125° F. I remember being told on arrival that it was a cool day ; it was only 127° F. Yet the nearest to a complaint I ever heard was that "it was a trifle warm for the time of the year !"

Our greatest worry was getting refreshing drinks for our really sick. For a time in the hottest period, all jellies, fruit-juices, fresh fruits, etc., gave out. Here the British residents, in this case nearly all connected with the Oil Company, came to the rescue. Through the whole of that difficult time they provided us with sufficient to give to our worst cases, and only those who have nursed in a really hot climate know what that means. As the cooler

weather came on they gave teas for those patients able to attend them in their own grounds. How the men appreciated them. As many remarked to me "it was like a little bit of home."

Our Mess was in an old Persian house, built in the form of a square, with a courtyard in the middle. As the heat increased, we hit upon the idea of converting two semi-underground cellars, normally used for storage purposes, into dining-room and sitting-room respectively. With the enthusiastic help of the R.E.s and a little native pottery from the Bazaars, they were made most attractive, and oh! the difference in comfort. They were degrees cooler. We slept on the roof in order to do so at all and coming down, even at 6 a.m., was to receive a blast of heat as from a furnace.

Ahwaz itself is a strong contrast to Teheran. A few squalid streets of native shops form the Bazaar. Everybody one meets looks more like a potential murderer than the last and I can quite believe the popular theory that the dregs of Persia are sent here. Thieving is rife. Although our windows and doors were barred and a guard stood on duty outside all night we sometimes had arms coming through the bars in an endeavour to steal something within reach. It was here that I was presented with Socks, mongrel son of a famous watchdog, who, I am glad to say, has more than upheld his mother's reputation.

In spite of the barrenness of our desert surroundings, in spite of the sharks in our river that sent us so many casualties, in spite of the "potential murderers," I was very fond of Ahwaz. I was happy in hospital, happy in my staff and in our friends, so that when orders for the Middle East came for me in December, I left with more than one regret.

FROM PERSIA TO EGYPT—BENGHAZI—TRIPOLI.

On December 9, 1942, I left Ahwaz and turned my face towards Egypt, not realizing I was about to commence one of the most interesting and happy years of my life in the Service. The journey was a varied one. The desert road across to Basra being impassable, owing to heavy rains, I went as far as Kharumpar by rail, travelling in what closely resembled a cattle-truck! There I spent the night in a camp, squelching my way through pouring rain and thick mud to my tent. Next day at 6 a.m. I was taken to a barge laden with Indian troops bound for Basra. There were no seats so I sat on a box with Socks at my feet; he was *very* happy, being fed with Chupattis, a kind of Indian unleavened bread. We arrived at our destination at 3 p.m. From here I went to Baghdad by train (a most comfortable one this time), having picked up three others in the Service travelling in the same direction. Two days in Baghdad, then a seventeen-hour journey across the Syrian desert by the famous Nairn Coach, arriving at Damascus about 9 a.m. Breakfast at an hotel, a much needed wash and brush-up, and we were on our road again. This time we went by car across North Palestine, skirting the beautiful Lake of Galilee, to Haifa. We spent the night at an hotel, entrain- ing for Cairo the next day. Arrived there, we stayed for a few days at a General Hospital. I reported to the Chief Principal Matron and received orders to proceed to a General Hospital almost immediately.

This General Hospital was then functioning as a half-hutted, half-tented desert hospital. Arriving only a few days before Christmas I was at once caught up in the whirl of preparation and festivities.

On January 2, 1943, we received orders to close down the hospital and prepare to go "into the Blue." The O.C. went first, followed next day by the Second-in-Command. We waited and, on January 15, nine Sisters and myself proceeded with the remaining Medical Officers and the Company to Alexandria. The Assistant Matron, with the remaining eighteen Sisters, was sent to be attached pro tem. to another General Hospital.

After a fortnight in Alexandria, staying in the Sisters' Mess at a General Hospital, we embarked on a Hospital Ship, arriving at Benghazi two days later.

I had seen a few ancient ruins by this time but the shell of Benghazi was the first modern one I had encountered. There was scarcely an undamaged building standing but the hospital buildings, shared by an R.A.F. Hospital and ourselves, were untouched. We lived in one

wing of the hospital to start with as the bungalows we occupied later were then unfit for habitation having been badly knocked about. The place was filthy and the Sisters started straight away to clean it up. Unluckily two of them dropped a marble table top on to their feet, breaking some bones ; but after a few days they were getting about quite nicely in plaster and walking-irons.

Two days after we landed we heard that the freight-ship carrying all our equipment had been torpedoed. Fortunately no lives were lost and a minute quantity was salvaged later. Owing to this catastrophe we were unable to receive patients for about a month. We spent the time in cleaning the wards, helping to whitewash our bungalows and in collecting odd furniture for hospital use and for our Mess. In all this we were greatly helped by outside units who were more than good to us.

The 4th Indian Division was there at the time and invited us to watch their Street Fighting School from a roof. It looked most realistic and real firearms were used, although no one could get hurt unless he was careless. For instance, one Indian threw a grenade into a doorway, then looked round the door to see how it was getting on ! He was lucky to escape with slight injuries.

All this time the convoys were going up to Tunisia. (Weeks later we saw them returning, their task accomplished.) The men seemed surprised to see us as they passed which rather surprised us. They cheered and waved every time they saw us and we were offered so many lifts whenever we walked abroad that we began to fear we must all look lame.

After five weeks we opened up the hospital with the minimum of equipment and the convoys of sick and wounded started to arrive. We worked partly in buildings, partly in tents. It was now growing warmer so we had no great anxiety over heating arrangements but the sanitary conditions gave much food for thought. The Red Cross were marvellous in supplying us with requisites for the men, most of whom came to us with no toilet accessories whatever. I remember once, when we received over 100 ship-wreck survivors, they came to me with supplies before I even knew the men were coming in.

By April the remainder of our Sisters joined us, together with our new O.C., Colonel Paterson, Colonel Holmes returning to Egypt. A few weeks after this we ceased to receive convoys and the usual "rumours" began flying round that we should soon be again on the move. Soon the rumours became a certainty and one day we were told to pack up.

That afternoon, as I wrestled with the Red Cross equipment, our Dental Officer and one of the Sisters came to me and shyly announced their wish to get married next morning ! Official permission had of course already been granted and the wedding had been planned to take place in Alexandria, to which the prospective bride had already received Posting Orders, to take place at the expiration of sick leave. Now they were forced to change their plans. They had their wedding in our own little home-made church, decorated with the flowers that grow in profusion and were ours for the plucking. After the ceremony they were drawn to the Mess in a beflowered "ghari" by a string of officers, led by the Area Commander and the A.D.M.S., our own Colonel and Company Officer acting as postillions. Somebody had just had a cake sent out from home (Australia) so there was even a wedding cake ! She left for Egypt a week later ; he came on with us.

Most of us were in Benghazi four months and I, for one, shall find it hard to forget. The countryside, with its carpet of flowers, blue, red and gold, stretching for miles on either side, the blue lagoon where we bathed, the gold of the wattle trees, the little white homesteads built by Mussolini (exactly to a pattern, as he would have liked all men to be). All so peaceful till one noticed the wrecks of cars, tanks, lorries and aeroplanes at intervals upon the wayside, grim reminders of the reason of our being there.

There is another reason why we shall not forget Benghazi. It is because of the help and comradeship so freely offered to us by the men of all ranks in the units amongst whom we worked.

We reached Tripoli early in June and were attached pro tem. to a General Hospital. Except for lecturing and examining the orderlies there was not much for us to do during our period

of waiting. Towards the end of our stay, as convoys started coming in, our Sisters were able to lend a hand there.

His Majesty, King George VI, paid a visit to Tripoli while we were there and we were present when he inspected the General Hospital. His visit meant a great deal to everyone, especially the men. At the same time we were greatly relieved to hear that he had arrived home again in safety.

Towards the end of July our men left for Sicily. One week later we embarked on a Hospital Ship and followed them.

SICILY.

On August 1, 1943, we disembarked in Sicily. We were met by the A.D.M.S. and learned that our unit was some miles away so that we were to spend the night at a General Hospital.

Next morning we set out for our new "home," which we discovered set in the middle of orchards. Lunch was ready for us in the Officers' Mess under the trees. The men, we discovered, had only arrived the day before, having been moved from their original site. Our tents were still in process of going up but some of the "wards" were ready and we were told that the first batch of patients was arriving that evening.

Our hospital was soon full but we had few really serious cases; great numbers of malarias, quite a percentage of dysenteries and minor surgical ailments.

The camp was ideally situated. The tents were all set under trees which gave a pleasant shade; the sun was warm but not oppressively hot as it had been in Tripoli. The patients were free to wander around the Camp, apart from the Mess compounds, and all looked fit and sunburned. We were surrounded by grape vines and groves of fig, almond and olive trees, all save the latter bearing ripe fruit. We all sent home nuts and wished we might send the fruit when it was so badly needed.

We could hardly get away from the illusion that we were on a "camping holiday"; tentage was short so our Mess tent was provided by a huge Lotus tree which served the purpose just as well and was far more picturesque. Black-out was very severe on account of Jerry's fondness for "popping over," so we could not show a light, even in our tents. Brains were racked for means to break the monotony of the dark hours after 8 p.m. One of the Sisters had a gramophone with which she occasionally gave gramophone recitals, working it in the dark. The Colonel organized a series of "talks" on different subjects by various people. All were invited to listen and join in the discussion after. It was in the orchards that our unit newspaper *Odyssey* was born. Articles of interest covering a wide range of subjects, poetry, criticisms, witticisms, sketches, were asked for and received from both staff and patients. Since that time, each Sunday morning, a copy has been set up in a prominent position where it could be read by all.

The Sicilians, like the Italians, were great thieves and the men missed many things from their tents. The Sisters lost nothing, thanks to the good offices of Socks. Always a good watchdog, he bore a great hatred towards the Italians. After he relieved one man of a piece of his trousers I decided to muzzle him as I was afraid of him hurting a child. He did not mind this much and, as he still looked and sounded ferocious, unwanted visitors kept their distance.

Four weeks after our arrival the Colonel told me at 6 o'clock one evening that he had received orders for us to move with the greatest speed possible. Our patients were evacuated by 10 a.m. next day. By the same time the day after, our entire equipment had been loaded and it and we were in our lorries on the road to our next destination.

We arrived at a small town under the shadow of Mount Etna after darkness had fallen. We now found ourselves in an old building which I trust had been more successful in its teaching than it had in its sanitary arrangements. We spent one night in what were later—wards. Next morning I went flat-hunting in the town with the Colonel and found two quite near together that made quite a suitable Mess. We also found a flat not far from the main building that made an excellent Sick Officers and Sisters Hospital.

Next day, while we were still unloading the hospital equipment, the patients started to arrive. Here we received patients that had come more or less directly from the battlefield. We were wearing white, as the local women laundered well for us. One morning I was startled to hear from the lines of ambulances bringing in the wounded, cries of "Look, look Do you see that ? a *real* English nurse."

We were nearly always full here, often overflowing. We had a Neuro-surgical and a Facial-maxillary team attached to us and the work was very interesting. The sad part was that we could only keep our patients for so short a time ; all except the dangerously ill had to go on as soon as possible to make room for others. Rows of patients were often waiting on stretchers to go out as others were coming in.

The whole district was heavily mined, even the edges of the roads beyond the immediate town were not safe ; and nearly every day we were admitting one or more victims. This, of course, prevented the Sisters from wandering far afield, but a "safe" bathing beach was soon found for us a few miles away so that we had plenty of exercise.

After about a month, the work showing signs of slackening off, the Colonel told me that we were shortly leaving to take over from a Casualty Clearing Station. He said the Advance Party was starting off next day and asked if I would like to go with them to make proper arrangements for the Sisters' Mess. I thought it an excellent idea, especially as the Sister-in-Charge of the C.C.S. was an old friend of mine.

The distance cannot be much more than 40 miles but, by the time we had finished waiting for traffic blocks on the road, it felt more like 400 ! We left at 9 a.m., we reached our destination after 3 p.m.

I had thought Benghazi a shell ; in both towns the hospitals appeared to have been respected. This building was quite a nice one of its kind if you excepted the usual more or less deplorable sanitary arrangements. The Medical Officers and Sisters had found accommodation but, as we carried far more Sisters than a C.C.S., we had to be housed elsewhere.

That evening Captain Brewer took me along to the A.D.M.S. who said he had found an ideal Mess for us, a 16th Century villa, dating back to the Medici family. It was then occupied by naval personnel and we went round for the men to inspect it ; it being considered too dirty for my feminine eyes to gaze upon. As I sat in the car two sailors leaned confidentially over the balcony : "Hey, Miss. Don't you let them put you in 'ere. There's a corpse under that gateway and it smells like it." They were perfectly right. Nevertheless, by the time "that" had been removed, a roof or two that had been shattered by bombs replaced, the house thoroughly cleaned, disinfected and cleared of the appalling rubbish, it was really quite delightful. We were left sufficient furniture by the owner to be very comfortable. A few of the Sisters joined me in a few days, and soon had everything ready for the others when they moved up with the unit.

We stayed our usual three to four weeks. The work was quite satisfying and, as we were not dealing with such large numbers, we were able to keep our patients longer. We received quite a number of enterics and diphtherias, as well as our fair share of malarias. Battle casualties were few.

ITALY.

On Monday, October 4, 1943, we came to Reggio in Italy. Here we waited for a few days before we entrained as some bridges had been damaged and were being repaired. We then went on to Bari but did not function as a hospital owing to lack of accommodation. Here we found hairdressers, tailors, cleaners and hat renovators, of whom we were all in sad need. We found we could not buy any new materials but it was a joy even to have one's old garments spruced up.

We were beginning to think of ourselves as the "Unwanted Unit" when in November orders came for the Advance Party to proceed to the further side of Italy. As I found I could stay at a General Hospital in Naples I went with it. We travelled by truck up by Foggia and across the Apennines to Naples, a delightful run. We reached the town after dark and

found that they kept their black-out only too well. We spent hours trying to find Headquarters. Forms kept looming out of the darkness and a Yankee voice would say, "Say, pal. Where you goin'?" To which we would sadly reply, "We only wish we knew." Once we found H.Q. our troubles were over.

Next day Major Craik and I were taken over to see our proposed future residence. It was still functioning as an Italian gaol and I can't say more than that it was all you would imagine an Italian gaol to be. So that was written off. Every day for a week we toured the surrounding district in search of a suitable site. We went over schools, monasteries, wine-factories and finally a castle. Wherever we went people were very kind to us but I had no idea it could have been so difficult to find us a corner in which to work. We had great hopes of our castle, a very fascinating one, spacious, more or less adaptable and in lovely surroundings, but it was decreed that we were to go elsewhere. This was being held in readiness for another General Hospital and we were sent to function there until they were ready to take over. Two days later we joined the rest of our unit and started work immediately to relieve the pressure in other hospitals. We had two 100 bedded expansions from a General Hospital attached to us here and found that we needed all the beds we could get.

The Mess buildings were not yet completed so we had to live in one wing of the Hospital buildings. The wards, when we got them cleaned and in working order, were quite nice, lofty and spacious. The roofs were in bad repair and were in process of being mended when we arrived. As the rainy season arrived at the same time, we spent the first week or two moving the beds to avoid a waterfall and arranging bowls to catch the drips! There were no actual baths, but plenty of showers and the hot-water system worked! Sanitary arrangements—as usual!

We enjoyed our work. Our patients were a cheery and appreciative crowd, the majority of them having come recently from the front line. I have never seen such enthusiasm shown over Christmas preparations, even the officers caught the infection. They did all the decorations themselves and they made a work of art of it; they also got up two concerts among themselves which they presented to the other patients and the Staff.

The village itself lies in a hollow surrounded by hills, giving it rather a sinister aspect. Probably this has some effect on the inhabitants for never have I seen such people, especially the men. Their clothes have all faded to a uniform shade of dusty grey and their faces are the same colour. They look sullen and hopeless as though they don't care what happens to them; the majority of them will steal anything. Probably lack of food is the chief reason for we found the girls who came to work in our Mess both reliable and reasonably efficient.

Our General Hospital began to arrive over Christmas and on New Year's Eve we found ourselves on the way in the teeth of a howling gale. This time we were going to buildings which were being vacated by the R.A.F. The latter were very good to us, had a blazing log fire in our Mess room to greet us, and had even laid on a New Year's Party to revive our dampened spirits.

Our Mess room had evidently been the one used by the Officers. It had a good floor and fireplace, a bar in one corner, and quite serviceable kitchen attached. Our sleeping quarters were also satisfactory.

The wards were not so good. The floors were of brick, very uneven, and felt damp. Only a few stoves and fireplaces were built in and it took a little time for Valor stoves to make any impression. As usual, our patients followed hard upon our heels and to our joy we discovered some bricklayers amongst them. Discovering some unused bricks lying about outside, they soon had fireplaces up in all the most serious wards. The R.E.s worked very hard, putting in lighting, making a workable operating theatre, more or less satisfactory latrines and wash-houses, even a laundry. Here our brooms gave out and we were unable to get replacements. For a time we were using twigs bound together till some Americans came to the rescue and gave us a supply of stout witch-brooms.

I don't know who was responsible for labelling Italy "sunny" but it certainly could not have been during the winter months. How it rained. What was later the hospital

cook-house was, on our arrival, a miniature farmyard. The cooks had to function more or less in the open while it poured "cats and dogs" and an icy wind blew—yet I never knew the food to suffer.

As we were very near the original landing-beaches, the neighbourhood was well mined and one could not venture off the beaten track. We admitted a lot of mine casualties during our early days, quite a number being local children. We also received many patients suffering from diphtheria which appears to be a common infection in these parts. We were kept reasonably busy and, as the weather improved, the surroundings began to look a little less grim. The patients were really marvellous. It was almost unheard of to hear a complaint, they were always cheery, always ready to help.

By March, 1944, I knew I was leaving the General Hospital, and though I realized it was to go home, I have never felt so sorry at leaving any unit. It was such a happy one. Nowhere could we have found a more considerate O.C. or myself such a loyal staff.

On March 10, 1944, I joined a General Hospital where I found everybody very excited, as they were then all expecting to go home. We worked up till two days before we left, for which I was very thankful, as there is nothing so trying as waiting for a long period with nothing to do. A few weeks after I joined the unit we found ourselves on the sea, going home.

And now Home, after nearly six and a half years. I found many changes, for the England I remembered was not at War. Yet conditions were very much better than I had expected. There is not one of us who is not wanting to go out again to help those who are prepared to sacrifice so much to give us back the England we knew.

REPATRIATION.

BY LIEUTENANT-COLONEL S. D. LARGE, *D.S.O., M.C.*,
Royal Army Medical Corps.

FEW people realize the nature of the work involved when Repatriated Prisoners of War arrive at a depot in this country for dispersal. They have to be medically examined, clothed, paid and sent on twenty-eight days leave. It sounds simple, and indeed it is, but it has to be done with speed and accuracy. These men have been in prison camps for a long time and are eager to get home. They are buoyed up with excitement and interest but they are physically unfit and the reaction of fatigue will surely set in, so the sooner and the more comfortably they can be got home the better. Because of their eagerness they are ready to accept everything without question so, for their sakes as well as for official purposes, accuracy in detail is essential.

Thus an account of the procedure followed in one depot will be of interest.

PREPARATION.

On receipt of the warning order preparations were begun. It was known from previous experience that the worst of the work would be documentation, as more than twenty forms had to be made out for each man, so all the necessary forms were got ready.

Conferences were called to discuss the best and quickest ways of carrying out pay, the issue of clothing and equipment, medical examination, etc. Rehearsals of the complete operation were held and the times taken by each department recorded. Thus it was found that it took three minutes to issue the required amount of clothing and equipment to each man, therefore it would be necessary to have at least two issuing points to keep this work in pace with the remainder.

It was arranged that the men would be housed in huts, in groups of 30, with two N.C.O.s and two orderlies to supervise each hut.

Baggage parties were detailed by a unit near the detraining station to meet the train and baggage parties from the trainees to meet the buses on arrival at the Depot.

Extra clothing and equipment were obtained and medal ribbons, rank badges, service chevrons, cap badges, etc., were drawn through the Director of Clothing and Stores.

The Messing Officer was authorized to spend £30 to provide specially appetizing meals.

E.N.S.A. and Y.M.C.A. were approached to arrange the best concerts possible. The Depot Players and Orchestra would perform during meals.

Arrangements were made with the B.R.C.S. and Order of St. John about the part they would play in the scheme. Offices were set up for various helping bodies, such as B.R.C.S., Welfare, Intelligence Officers, etc. Rooms were got ready adjoining the huts for medical and dental examination by 6 medical and 3 dental officers.

ARRIVALS.

At 04.20 hours, on May 29, 195 Repatriated Prisoners of War detrained from an Ambulance Train at a station some miles away. They were met by the Commanding Officer, Quartermaster and members of the Depot staff and were immediately embussed on troop-carrying lorries provided by the D.D.S. & T. At 05.00 hours they debussed on the parade ground, were divided into groups of 30 on markers and were escorted to their rooms, each group having a baggage party. Tea and biscuits were served and documentation began immediately in all seven rooms. This was completed by 07.30 hours, by which time a good many had also been medically and dentally examined.

Breakfast was at 08.00 hours and, at 09.00 hours, medical examination continued, the first payment of £2 per man was made, and the issue of clothing and equipment commenced. Until this was done the men were kept in their groups of 30 for convenience but, after each group was finished with, it dispersed about the camp.

Dinner was at 12.00 hours and after dinner a second and larger leave payment was made and the issue of clothing and equipment continued.

By 15.30 hours the work was completed and it would have been possible to send the men on leave but arrangements had previously been made by Headquarters for the Press to come to the camp to interview the Repatriates at 10.00 hours the following morning so the men were kept for the Press visit and, after an early dinner, were despatched to their homes in different parts of the country.

DOCUMENTATION.

Documentation began as soon as the men arrived. Four clerks were seated at a table at one end of each hut and one man at a time was interviewed and his particulars recorded on 9 different forms. As soon as this was completed in each room the forms were disposed of as follows :—

- (1) The record cards and two copies of the nominal roll were taken to the Orderly Room.
- (2) The A.B. 64 and one copy of the nominal roll were taken to the Pay Office.
- (3) The Medical and Dental cards were given to the men to take with them when they went for examination.
- (4) Two clothing forms for each man were given to the N.C.O. in charge of the room to take to the Quartermaster when the room reported for issue of clothing and equipment.

When the record cards and nominal rolls were received in the Orderly Room the following forms were prepared from them :—

- (1) Ration cards, 4 per man, showing name, initials and Army number. Signed by an Officer.
- (2) N.A.A.F.I. forms 578 B showing Army number, rank, name and regiment, period of leave and number of weeks.
- (3) Army Form W. 4098 (Pass and Railway Warrant) showing number, rank, name, regiment, period of leave, entraining and detraining stations. Signed by an Officer. Counterfoil also completed. Return half of railway warrant cancelled.
- (4) C.R.C.S. 1A. (Claim for clothing coupons) endorsed " Repatriated Prisoner of War " was issued to each man for use if he was entitled to it.

Thus the following forms were used :—

- (1) Record Cards for the following particulars :—
Name, Number, Present Rank, War Substantive Rank, Regiment or Corps, Former Unit, Prisoner of War Camp or location, Next of Kin and address, leave address, nearest railway station, leave granted, whether in possession of artificial limb, age.
- (2) Notification to Record Officers and Paymasters of period of leave granted, leave address, and request that posting instructions be sent direct to the man at his leave address.
- (3) Army Form H. 1157, Clothing and Equipment record.
- (4) Leave ration cards endorsed " All coupons hereon valid for week ending———" and with one soap coupon on each cancelled.
- (5) Army Form W.4098 endorsed " Repatriated Prisoner of War."
- (6) Army Form B.2063 (Africa Star Claim Form).
- (7) Army Form B.2067 (1939-1943 Star Claim Form).
- (8) Army Form I.5033 (Dental card).
- (9) Army Form I.1201 (Artificial Denture form).
- (10) Army Form I.1201A (Artificial Denture form for retention by man).
- (11) Army Form O.1865 (Home Cash Allowance roll for claiming leave ration allowance).

- (12) Army Form N. 1513 (Acquittance rolls for Issue of Pay).
- (13) Army Form B. 2626 (Voting forms—Parliamentary Election).
- (14) Army Book 64 Part II (latest print)—(Pay Book).
- (15) N.A.A.F.I. Form 578 B (To enable men to purchase tobacco and confectionery at special rates while on leave).

These forms were completed and checked and ready for issue by rooms at 12.30 hours.

Pro formas were completed for dispatch to Officer in charge of various Record Offices, giving the necessary particulars of all men belonging to units administered by them. These forms requested that posting instructions and railway warrants be issued to the men at their leave addresses. A copy of this *pro forma* was sent to the appropriate regimental paymasters, together with Army Form O.1865 (Home ration cash allowance roll) in duplicate, in order that any balance of pay could be sent to the man at his leave address.

The compilation of nominal rolls was a lengthy undertaking. These nominal rolls were required for the information of various branches of the War Office, Officers in charge of Records, British Red Cross Society and Order of St. John. They contained the following details :—

Name in full, present rank, war substantive rank, Army number, age, regiment or corps, former unit, place of internment or Prisoner of War camp, name of hospital, date of arrival in United Kingdom, medical category, whether Certificate of Interrogation had been produced.

There were 9 pages of these nominal rolls and 25 copies of each page were stencilled. These were ready for despatch on May 31. A similar nominal roll, showing, in addition, the weight of each man was forwarded to War Office, A.M.D.2, on May 31.

MILITARY INTELLIGENCE.

It had been arranged that an Officer from the War Office, M.I.9, would come to interview any men who could give useful information. An office was provided for him and the men informed of his presence and, if they had any information to give, were escorted to him.

This Officer was kept working throughout the whole time and expressed his satisfaction with the amount of important information he was given and the number of men who came to see him.

An Officer from the War Office, P.W.2, was also provided with an office to interview other ranks who had been Prison Camp leaders or deputy Camp leaders.

PRESS.

At 10.00 hours on Tuesday May 29, 20 representatives of the Press arrived and interviewed groups of the men ; each member of the Press was handed a copy of the War Office instructions as to interviews and publication of interviews and photographs. Every assistance was given to them and they expressed their satisfaction with the arrangements.

A representative of the Ministry of Information was given lists of home addresses to enable the local Press to get in touch with the Repatriates.

BRITISH RED CROSS SOCIETY AND ORDER OF ST. JOHN OF JERUSALEM.

In accordance with War Office instructions, contact was established with the Headquarters ——— County of the B.R.C.S. and Order of St. John of Jerusalem. A week before the men were expected a Representative called at the Depot by appointment and arrangements for the following matters were made :—

- (1) To set up camp headquarters.
- (2) To establish a store.
- (3) To provide accommodation for officers and staff.
- (4) To provide equipment for the office.
- (5) To use the camp telephone.

- (6) The time when work with the Repatriates could commence.
- (7) Liaison with the Commanding Officer, Adjutant and Staff during operation.
- (8) Meals for officers, organizers and helpers.
- (9) Transport to take Repatriates to the local station and the London termini. This, except for one lorry and a small ambulance belonging to the Depot, was entirely provided by the B.R.C.S. and Order of St. John.

As soon as the exact time of arrival was known, further contact was made with the B.R.C.S. B.R.C.S. and Order of St. John arrived at 09.00 hours on May 29, Officers and helpers numbering thirty-five.

Their work with the Repatriates commenced as soon as documentation and medical examination of each group were completed. Each man was issued with 40 cigarettes, one set of stationery, two handkerchiefs, 1 razor and 7 blades. In addition the following articles were issued : 2 oz. of tobacco to 164 men ; a pipe to 100 men ; a pencil to 122 men ; kit bag to 50 men.

Men going on long journeys were also issued with hair brushes, combs, tooth brushes, tooth paste and tablets of soap.

In each barrack room there was an officer of the B.R.C.S. with one or more helpers. These sewed on service chevrons, rank badges and medal ribbons, etc., to the men's uniforms.

Telegrams to relatives and friends were sent free of charge for every Repatriate. Two mobile canteens distributed tea, lemonade, cake, sandwiches and cigarettes throughout the time the men were at the Depot. They became the gathering point for the meeting of friends.

The B.R.C.S. and Order of St. John found out train departure times for all men travelling by train and also arranged for personal escort in special cases. Men were met at London termini by B.R.C.S. representatives, escorted to trains and seen off safely. Those going on long journeys were met at their destination and provision was made for refreshments at every stopping place *en route*.

One man who was deaf was provided with a special instrument to enable him to hear and was escorted to his home by a B.R.C.S. representative. A great deal of trouble was taken to obtain this special instrument.

All this invaluable work, without which the operation could not have been successful, was being carried out while the Depot work proceeded. Yet the co-operation between the B.R.C.S. and Order of St. John and the Depot staff was so smooth that the urgent depot work was not impeded in the slightest. No tribute could be too high for the very welcome and valuable assistance given by the B.R.C.S. and Order of St. John.

ENTERTAINMENT.

During meals the Depot orchestra played in the Dining Hall and selected members of the Depot Players entertained the troops. In the evening E.N.S.A. provided a special concert party and after the concert one of the Repatriates, a professional pianist, played for an impromptu dance ; the A.T.S. acting as partners. The W.O.s and Serjeants were entertained to a concert and social evening in the Depot Serjeants' Mess.

WELFARE.

On arrival the Repatriates were told that there was a Welfare Department which would give them every possible assistance in any personal problem, and seventeen availed themselves of the Welfare Officer's offer of advice and help.

DEPARTURE.

By 11.00 hours the kits and baggage of the R.P.s.W. were taken to the parade ground and grouped according to barrack rooms. At 12.45 hours the Repatriates were assembled on the parade ground by rooms with their kit and belongings.

Transport to take them to the station provided by the B.R.C.S. and Order of St. John was parked behind them ready to move.

Each man had been issued, while still in the barrack room, with a travelling warrant, leave pass, ration card, N.A.A.F.I. card 578B, and a card for claiming clothing coupons if entitled to them. When all were ready they were called by microphone, according to the district to which they were travelling, and taken by transport either to the local station or to the appropriate London terminus.

When necessary, guides provided by the B.R.C.S. and Order of St. John travelled with the individual, in some cases all the way to their homes.

The last party left at 14.30 hours on Tuesday, May 29, that is to say thirty-three and a half hours after arrival, although, had it not been necessary to keep them overnight in order that they might be interviewed by the Press, they could have been despatched to their homes eleven hours after their arrival at the camp.

The whole operation worked smoothly and without a hitch, largely because of the discussions and rehearsals held beforehand and the willing co-operation of bodies like the B.R.C.S. and Order of St. John.

Editorial.

RETIREMENT OF COLONEL S. LYLE CUMMINS, C.B., C.M.G.

It is with great regret that we announce the retirement of Colonel S. Lyle Cummins, C.B., C.M.G., from the Editorship of the *Journal*.

The Director-General, Army Medical Services, Lieut.-General Sir Alexander Hood, K.C.B., C.B.E., M.D., K.H.P., pays the following tribute :—

“ On the retirement of Colonel S. Lyle Cummins from the Editorship of the *Journal*, it is well that his great service to the Corps during a very difficult period should be acknowledged. Colonel Cummins became Editor of the *Journal* in January, 1941, and during the past three and a half years has maintained the high standard of our journal and enriched its pages from his wide knowledge and experience. Those who have worked with him during that period have found him a delightful colleague and a very wise and kindly counsellor. Our good wishes go with him.”

We are sure that everyone will join in wishing Colonel Cummins many happy and useful years.

The Editor wishes to take this opportunity of thanking all the Contributors who have helped to keep the *Journal* alive by submitting articles, the preparation of which must have meant many hours of labour during busily occupied days.

It is hoped that the supply will be maintained. There are a few points to keep in mind. Space is limited by conditions not under our control. Brevity and succinctness are therefore desirable. We hope that the existing happy relationship between Contributors and the Editorial Staff will continue.

Clinical and Other Notes.

AN INTERESTING CASE OF INFECTIOUS MONONUCLEOSIS.

BY MAJOR G. H. WOOD,
Royal Army Medical Corps,

AND

LIEUTENANT S. J. P. CIAPPARA,
Royal Army Medical Corps.

CADET J., age 28. Service 9 years (T.A.).

The above-named was sent in on July 30 from a C.R.S. as a case of infective hepatitis with a history of general malaise, abdominal discomfort and pyrexia over a period of about ten days. The jaundice had appeared on the previous day, July 29.

On July 31 there was a well-marked enlargement of the lymphatic glands of the posterior triangles of neck and axillæ. A blood count showed red cells $5\frac{1}{2}$ million, white cells 22,000 with 70 per cent lymphocytes. This was considered sufficient to warrant a definite diagnosis of infectious mononucleosis. Urine showed a fair quantity of bile on this day and this persisted for about ten days.

On August 1 he developed well-marked dirty patches on both tonsils. Lab. Report dated August 2 stated "Organisms of Vincent's Angina present. No K.L.B. No H.S."

On August 2 spleen was found to be slightly enlarged and the general picture remained the same; moderate pyrexia persisted.

August 5: Paul Bunnell Test negative.

August 6: Jaundice less marked. Glands still palpable in neck and axillæ.

Blood Count showed 76 per cent lymphocytes. Spleen still enlarged.

August 9: Throat clean. Jaundice cleared; white cell count down to 12,000; glands still enlarged; Paul Bunnell Test again negative.

August 13: Satisfactory progress. Temperature normal; spleen not palpable; swelling of glands diminished; white cell count 8,000, 67 per cent lymphocytes. Paul Bunnell Test negative again.

August 19: No glands palpable; white cells 8,000, 67 per cent lymphocytes. Feels practically well. Paul Bunnell Test positive 1/128.

August 30: Convalescence uneventful, white blood count down to 6,800.

September 15: Discharged from hospital.

DISCUSSION.

The interesting features of this case were that most of the classical symptoms of this disease were present and also the fact that the Paul Bunnell Test only became positive in the fifth week of the illness and several days after the symptoms had subsided. Owing to the pre-admission diagnosis of infective hepatitis the patient was admitted to the Isolation Block and nursed there throughout. No other patients or staff were infected and the treatment throughout was symptomatic.

Summary.—The importance of the early differential blood-count for diagnostic purposes is emphasized. The Paul Bunnell Test is usually positive towards the end of the second week but a negative reaction even in the fourth week does not disprove the diagnosis.

DERMATOLOGY ON ACTIVE SERVICE

WITH A PLEA FOR RE-ORGANIZATION OF THE SKIN DEPARTMENT.

BY CAPTAIN JOHN SAVAGE,

Royal Army Medical Corps.

THIS account is based on cases seen during the Tunisian campaign, roughly March, April and May, 1943. During this campaign all skin cases evacuated eastwards, i.e. practically the whole of the dermatological cases of the 8th Army, were treated at the one hospital in Tripoli. It is unusual for all skin cases to go to one hospital and this arrangement provided me with a unique opportunity of seeing the types of cases requiring evacuation during active operations. The skin department was normally 100 beds, expanded to 200 during this period.

The actual number of cases admitted was 1,298. This proved to be 35 per cent of all medical admissions and demonstrates clearly the loss of manpower and interference with Army routine caused by skin diseases. The amount of interference is actually much higher than this, as any M.O. will confirm that at least 7 out of 10 men attending sick parade do so because of skin trouble.

THE CASES.

These are listed below in Table I showing percentage of total. Table II shows the types of cases attending the out-patient's department during this period. They are shown in order of frequency.

TABLE I.

<i>Diagnosis</i>	<i>Per cent of total</i>	<i>Diagnosis</i>	<i>Per cent of total</i>
Impetigo	36	Hyperidrosis feet ..	1.9
Furunculosis ..	14.1	Urticaria	1.8
Scabies	13.3	Pruritus ani	0.7
Dermatitis (all causes)	8.7	Acne vulgaris	0.4
Mycotic infections..	7.5	Lichen planus	0.3
Eczema (all types) ..	4.7	Pityriasis rosea	0.3
Psoriasis	4.5	Sycosis barbæ	0.2
"Desert sores"	3.2	Ichthyosis	0.1
Herpes zoster	2.3		

TABLE II.—OUT-PATIENTS (IN ORDER OF FREQUENCY)

<i>Diagnosis</i>	<i>Diagnosis</i>	<i>Diagnosis</i>
Mycotic infections	Psoriasis	Urticaria
Eczema (all types)	Alopecia areata	Lichen planus
Dermatitis (all types)	Furunculosis	Erythema multiforme
Warts	Ecthyma	Lupus erythematosus
Impetigo	Acne vulgaris	

It will be seen that 63.4 per cent of admissions were for pyogenic skin diseases including scabies. Seven types of case, namely, impetigo, furunculosis, scabies, dermatitis (all causes), mycotic infections, eczema (all types) and psoriasis, form 88.8 per cent of the series and briefly the treatment and observations on these will be considered.

IMPETIGO.—This was the commonest cause of admission. Fifty consecutive cases were cultured with the following results. *Staphylococcus aureus* 78 per cent, *Staph. albus* 17 per cent and non-hæmolytic streptococcus 5 per cent.

Treatment.—Whilst in charge of a similar skin department in Egypt, all cases were treated with 5 per cent sulphonamide in calamine lotion if very moist, followed by 5 per cent sulphonamide paste. Trial was also made with sulphapyridine and sulphathiazole lotions and pastes.

During the three months of the Tunisian campaign all cases were treated with starch poultice if very crusted, simple lotions and pastes, e.g. sulphur 2 per cent in calamine lotion, Lassar's paste and paste flav. (10 gr. to ounce of hydr. oxid. flav.).

Unlike most other writers on the use of sulphonamide locally in impetigo I found, on looking over personal case cards, no difference in the number of days required to cure. Sulphonamide by mouth, however, proved very useful in severe cases.

Another point which arises in war dermatology as against similar cases in civilian practice stressed by Lieutenant-Colonel Tate (M.E. Adviser in Dermatology) is the fact that you may sensitise a patient to sulphonamide which may, at a later date, have grave consequences.

He has seen several cases where a patient was treated for impetigo by his M.O. with perhaps sulphonamide powder. A week to ten days later the same soldier became a casualty and was treated routinely with sulphonamide by mouth. Lieutenant-Colonel Tate reports that these cases often react as if they have been sensitised to sulphonamide, developing high fever, widespread erythemas, vesicular and bulbous eruptions. These patients are very ill and added to the effects of their wound the sensitization may just tip the scales against them. Why then should you deprive a soldier of a life-saving drug when his skin condition would clear up as quickly without taking this risk?

FURUNCULOSIS.—A very common cause of admission to hospital; every Army sick parade has its quota of boils.

Treatment was very simple and consisted in swabbing the lesions and surrounding skin with 1:1,000 hydrarg. perchloride three times a day with dry dressings. The use of fomentations was discouraged. If very severe with lymphangitis and adenitis a course of sulphonamide was prescribed. In persistent and recurrent cases an autogenous vaccine was prepared, with indefinite results.

SCABIES.—This formed 13 per cent of cases. Scabies tends to be over-diagnosed in the Army. Most cases were infected. No benzyl-benzoate was available and treatment was by ung. sulphur B.P. or Marcussen's ointment. The routine was, first day, hot bath with scrub, followed by application of ointment from the neck downwards; second day, more ointment; third day, ointment in the morning and cleansing bath in the afternoon. All kit passed through the disinfectant and discharge, in an uncomplicated case, followed on the fourth day.

DERMATITIS.—The various causes are listed below:—

TABLE III.

Type of dermatitis	Per cent of total	Type of dermatitis	Per cent of total
Infected	59	Chronic solar	1
Seborrhœic	20	Exfoliative	2 cases
Venenata	18	Artefacta	1 case

Treatment in dermatitis infectiosa (the commonest type) usually consisted of dressing with 2 per cent sulphur and calamine lotion or methoyle 2 per cent in calamine lotion passing on to a simple paste and finishing with a cream.

MYCOTIC INFECTIONS.—All types were met with *Tinea cruris*, *circinata* and *versicolor*. Treatment was by the usual textbook preparations.

Special mention must be made of epidermophytosis of the feet. This diagnosis was very commonly made in the M.E., the condition being definitely over diagnosed with unfortunate results. Most of these cases were simple pyogenic intertrigos of the toes and, since having a taste of a soldier's life under active service conditions, it is easy to understand how the condition begins. A little dirt collects between the toes causing friction; this produces irritation with possible scratching and a small focus of infection is started. One or several toes may be affected. When he eventually reports sick his M.O. in many cases diagnoses epidermophytosis and treats the same with a fungicidal. This does not clear up the condition and, as it is common knowledge that epidermophytosis is stubborn to treat, the fungicidal is often applied with renewed vigor or in greater strength. Most of these cases eventually land in hospital badly infected with inguinal adenitis.

The treatment carried out was pot. permang. cleansing baths with eusol dressings if very purulent, gradually passing through the stages of lin. calamine, ichthyol-calamine lotion and Lassar's paste. The time taken to clear up completely was considerable and relapse was common unless a prolonged period of convalescence followed.

ECZEMA.—Treatment varied with the various stages, viz. erythematous, vesicular, weeping, dry and scaly, and lichenified. The preparations used in these stages were, lotio calamine, ichthyol 2 per cent in calamine lotion, Lassar's paste, tar paste, and crude coal tar. Autohæmotherapy was also tried.

PSORIASIS.—This troublesome condition seems to be just as common in the M.E. as at home. All the usual types were seen and no ætiological factor was found.

Treatment was by ung. chrysarobin B.P. with good results. The following preparation was used if the scalp was affected. Ol. cadinæ 12 per cent, ac. salicyl. 4 per cent, ung. hydr. ammon. 6 per cent, in olive oil.

DESERT SORES.—So much has been written about this subject giving results of cultures, ætiology, vitamins and treatment that it was only after careful consideration that I decided to include my experience and ideas in this paper. However, when one realizes that 42 per cent of all admissions to the skin department in Egypt during three winter months was for "Desert Sores," probably a good deal higher in a corresponding period in summer, one must ask oneself the cause of this common complaint.

In my opinion there are three reasons, viz. (i) individual susceptibility to sunlight ; (ii) water ; (iii) medical care.

The desert sore is definitely commoner in the fair-skinned freckly type. These individuals take the sun badly, their skin cracking and blistering on exposure to sunlight and, although the so-called primary type of lesion does exist, by far the majority of sores start as a minute infected abrasion commonly on the back of the hands and front of knees.

In the desert it was difficult to spare enough water for frequent washing and infection was often made worse by the countless flies. Also, from information received from M.O.s who served throughout the desert and Tunisia, due to the vast expanse of desert with few roads, medical units were often widely separated, resulting in many men being unable to attend early and regularly for dressings. What then started as a small infected abrasion would gradually develop into a chronic ulcerated sore.

Fifty consecutive cases were cultured, results being over 70 per cent of cases *Staph. albus* or *Staph. aureus*, the remainder being, in order, *B. coli*, hæmolytic streptococcus and diphtheroids. One case from which K.L.B. was cultured was met with but not in this series.

Treatment carried out was eusol dressings, b.d., if very purulent, followed by a paste consisting of 5 per cent sulphonamide in zinc paste or an easy one made with crushed up tablets and lotio acriflavine.

Finally, I feel that some re-organization of the Skin Department is required to ensure early diagnosis and the best possible treatment as the present arrangement, whereby the Skin Department is the "Cinderella" of the Medical Wards, leads, amongst other things, to excessive use of dressings, pastes, lotions, etc., largely due to too frequent changes in medical personnel.

The first essential, however, is for unit M.O.s to send all unusual cases early to a recognized skin centre where the advice of a specialist can be obtained and, very important, where the proper preparations are available.

I feel that something after the lines of the V.D. Centres attached to a General Hospital is what is wanted. You would then have a M.O. who has had previous hospital experience, a specially trained skin staff and a laid down minimum of equipment.

Such an arrangement would make for earlier diagnosis, more expeditious treatment and quicker return to duty, with consequent saving of man-power and material.

A CASE OF EXTRADURAL HÆMORRHAGE PRODUCING MUTISM AND HEMIPLEGIA.

BY CAPTAIN A. D. LEIGH, M.R.C.P.,
Royal Army Medical Corps.

A 30-year-old Hindu was returning home with his family on the night of November 11, 1943, when he was set upon by dacoits. He was beaten over the head with lathis (long bamboo staffs) and then thrown down from his bullock cart, beaten further, and left unconscious on the ground.

For the next week he lay unconscious, swallowing fluids only with difficulty and incontinent of urine and faeces. Towards the end of this period he began to open his eyes and to look about him and it was noticed that he did not move his right arm and leg, nor would he speak. He remained in this state, never uttering a sound, until he was brought to the American Mission Hospital, Bareilly, where, by the courtesy of Dr. Perrill, I saw him on November 26, 1943, fifteen days after the beating.

He was a thin, poorly-developed Hindu, who lay apathetically on his back with no spontaneous movements of the limbs. There were multiple bruises and lacerations; bruising of the right cheek and laceration of the left fronto-parietal and right supra-orbital regions. Bilateral sub-conjunctival ecchymoses were present. On gently palpating the scalp multiple fractures could be felt on the left side. His eyes would move in the direction of a loud sound but he would not obey any command and I formed the impression that he had a profound aphasia. Gag and swallowing reflexes were preserved; there was no neck rigidity. He did not respond to pin-prick but firm pressure over the liver evoked a groping movement of the left arm.

His pupils were equal, normal in size and reacted briskly to light and accommodation. Fundi were normal, fields impossible to test. Full range of ocular movements and no nystagmus. No facial movements whatsoever could be obtained and there was a complete right flaccid hemiplegia with diminished tendon reflexes; the right plantar reflex was absent, the left flexor. His tongue was foul, his skin dry. Pulse-rate 100, feeble. B.P. 70/50. Temperature 97.6° F. A blood-count on November 25 showed Hb. 75 per cent, R.B.C. 4,600,000 and W.B.C. 21,000.

The physical signs remained unchanged for the next three days but his condition was slowly and insidiously deteriorating—he became more apathetic and less responsive. His pulse was running between 100 and 110, and his temperature was around the norm.

On November 30 a spinal tap was performed—pressure 15 mm. of cerebrospinal fluid, with a rapid rise and fall on jugular compression; 5 c.c. were withdrawn. The cerebrospinal fluid was clear but contained 80 mgm. of protein and 80 R.B.C.s per c.mm. There was still no change in the physical signs but his temperature began to climb on the morning of December 2, and he died a few hours later (temperature 103° F. rectally).

An autopsy was performed later the same day by the civil surgeon. "Skull—multiple fractures left side of calvarium, with about eight loose fragments and a fracture line running into the left temporal bone and tearing the middle meningeal artery. There was a dark clot adherent to the outer surface of the dura, $\frac{1}{2}$ inch thick and covering the entire left frontal, parietal and temporal lobes. The surface of the brain was clear and there were no hæmorrhages seen by the naked eye in the brain substance." There is no record of any pressure cone.

SUMMARY.

The sequence of events in this case was unusual. It seems reasonable to assume that tearing of the middle meningeal artery occurred at the time of the beating and that an extradural hæmorrhage then occurred. Extensive bleeding took place and he "lay unconscious" for seven days but then emerged from coma. The shattered skull had presumably acted as a natural decompression and bleeding had ceased with the fall in blood-pressure. When examined fifteen days after injury, mutism, stupor and a right flaccid hemiplegia were the presenting signs, with a low B.P. (70/50), low spinal fluid pressure (15 mm.) and an increase in protein (80 mgm.). Consciousness was retained in spite of the pronounced focal signs. There were no abnormal pupil signs and the diagnosis of a massive left-sided intracerebral hæmorrhage was made. Death occurred twenty-one days after injury and the salient post-mortem finding was a large left-sided extradural hæmatoma.

THE CONTROL OF NAUSEA AND VOMITING IN SPINAL ANÆSTHESIA.

BY MAJOR J. D. ROCHFORD, M.B., D.A.,

Royal Army Medical Corps.

THE object of this paper is to present three small but selective series of spinal anæsthetics demonstrating one way of controlling the nausea and vomiting which, however slight, often occurs during and after spinal anæsthesia.

Briefly the causes of nausea and vomiting under spinal techniques are the fall in blood-pressure following induction, traction on the mesentery and viscera but in particular the meso-appendix, the presence of bile in the stomach, psychic effects, the idiosyncrasy to pre-operative morphine and the effects of the anæsthetic *per se* (Maxson 1938). The final common path of all of these causes is along the parasympathetic supply to the stomach and gut. This path cannot be blocked by a "spinal" injection.

How then can nausea and vomiting be controlled?

A regional block of the parasympathetic supply to the stomach can be established by injection around the nerves near the lower part of the œsophagus. This will control these ill-effects but there is a danger of including the terminal branches of the phrenic nerves with consequent diaphragmatic paralysis; moreover, only sometimes is the œsophagus within reach of the surgeon.

Recently Anderson and Morris have shown that, contrary to the usual opinion, small doses of atropine (i.e. 1/100 gr.) produce an increase in the contractions of the human stomach while a larger dose (i.e. 1/50 gr.) will produce a long cessation of gastric contractions. Therefore, theoretically, a large dose of atropine should control vomiting. The vomiting can also be controlled by rendering the patient unconscious by giving a light general anæsthetic in conjunction with the spinal; in particular cyclopropane, nitrous oxide or pentothal. In 100 cases of epigastric, incisional and inguinal herniæ, performed on healthy adult males, the incidence of nausea or vomiting was 10 per cent. The anæsthetics used were 5 per cent stovaine and 1 : 1,500 nupercaine. Nearly every case which vomited had been anæsthetised with stovaine.

In the above series nearly all of the factors which cause nausea or vomiting were present to a greater or lesser degree except traction on the mesentery. I believe that the vomiting and nausea when it occurred was due to the anæsthetic *per se*, in this case nearly always stovaine, or to the psychic trauma involved.

However, in a series of fifty appendicectomies performed on healthy adult males between the ages of 18-45, premedicated with alopon and scopolamine one hour before operation and anæsthesia induced with an average dose of 12 c.c. of 1 : 1,500 nupercaine, the incidence of nausea or vomiting was 40 per cent which seemed extraordinarily high when the available literature was consulted.

A second series of fifty consecutive appendicectomies was embarked upon, using the identical technique of the first series, but oxygen and carbon dioxide was administered from the beginning of the operation until the peritoneum had been closed. In this series the total number complaining of nausea or having vomited was nine, i.e. 18 per cent. As opposed to the first series the vomiting often occurred at the end, or after, operation rather than during it.

In local and regional anæsthesia if there is sufficient sedation there is much less shock, much less circulatory disturbance and hardly any nausea (Bourne, 1942). With the above statement in mind it was determined to note the incidence of nausea or vomiting in a third series of fifty consecutive appendicectomies using a similar technique to the first but, following on the induction of the spinal block, an intravenous injection of morphine was given according to the following technique: $\frac{1}{4}$ gr. of morphine dissolved in 2 c.c. of normal saline given slowly intravenously over a period of two minutes. If the pupils contracted down quickly during injection only $\frac{1}{4}$ gr. was given. Some cases were given alopon $\frac{1}{4}$ gr. in lieu of the morphine.

The above procedure has been used over long periods with safety. Moreover, the morphine disappears from the circulation within one hour. This series showed no increase in post-operative chest complications. The technique has been used in major thoracic surgery with success.

It was particularly noticed that the patients in this series were quiet, restful and warm. No case gave any cause for anxiety. No case vomited at operation, two felt nauseated, one of them vomiting five hours after completion of operation; incidence was expressed as 4 per cent.

SUMMARY.

(1) Vomiting and nausea is commoner than is supposed under spinal anaesthesia especially with traction on the meso-appendix.

(2) The use of continuous oxygen and carbon dioxide will prevent these effects in some cases.

(3) Medication with intravenous morphine will prevent these effects in the great majority of cases.

REFERENCES.

- MAXSON (1938). "Spinal Anaesthesia."
 HOWARD JONES (1934). *Med. Press and Circular*, October 3.
 ASHWORTH (1938). *Proc. Royal Soc. Med. (Anaesth. Sect.)*, February 4.
 ANDERSON, W. F., and MORRIS, N. (1942). *J. Pharmacol.*, **77**, 258.
 BOURNE, W., *et al.* (1942). "Anaesthesiology," **3**, pp. 272-281.
 WIGGINS and SCHULTZ (1941). *Amer. Journ. Surg.*, **54**, 4-17.
 ADRIANI, J. (1941). "The Pharmacology of Anaesthetic Drugs."

THE THERAPEUTIC USE OF VITAMIN C.

By W. R. G. ATKINS, O.B.E., F.R.S.

Late Captain, Royal Army Medical Corps;

AND

R. A. FISHER, Sc.D., F.R.S.

SUMMARY.

OBSERVATIONS made upon two sections of R.A.M.C. men dosed with vitamin C gave differences far beyond those that could be attributed to chance. It was ascertained that men of one section were dosed before breakfast, those of the other after it. The latter became saturated and excreted excess vitamin sooner than the former.

In the winter 1941-42 and late spring 1942 an investigation planned by the Hygiene Directorate of the R.A.M.C. to ascertain the vitamin C reserves of troops was carried out by one of us. The method used was that of Harris and Abbasy in which men are dosed with vitamin tablets till an analysis of the urine indicates an approach to saturation; this may take from a few days up to ten or twelve in scorbutic cases. At each station a hundred men were tested; in one instance half were infantry and half R.A.M.C. personnel of a military hospital. The latter were in equal sections, A and B, and it happened to be convenient to dose section A, the infantry and section B in that order starting at 07.30 hrs. Section B went on with their hospital work till required for dosing, at about 08.00 hrs. There were most unexpected differences between the two R.A.M.C. sections. The men shared the same Me.s and had miscellaneous hospital work. They were sections only for A.R.P. and similar duties. Accordingly very different behaviour in these sections appeared to be a severe blow to one's confidence in the method. The results were as follows. Four doses were given; men near saturation after four doses were listed as saturated after five. Five (a) in the table denotes men showing such an increase in excretion as to appear likely to be

saturated after six doses ; five (b) shows those so low after four doses that no prediction could be made.

Urines were collected in the order of dosing, so that the times of retention were as nearly as possible equal.

<i>Doses to saturate</i>	<i>Men A</i>	<i>Men B</i>	<i>Doses</i>	<i>Men A</i>	<i>Men B</i>
1	0	0	5	9	1
2	0	1	5a	1	0
3	4	14	5b	2	0
4	6	5			

Inquiries failed to reveal any difference between the sections, such as age, weight or occupation, to which their behaviour in the test could be attributed. The results were reported without any explanation being possible.

The same hospital was visited four months later and further inquiries elicited the fact that the section A men of the R.A.M.C. had paraded at 07.30 hrs., before breakfast, having been busy attending to patients. Section B men, finding they were not required immediately, had their food and received the dose of vitamin C afterwards. This routine was followed on subsequent days. It appears therefore that vitamin C is much better utilized after other food which is in keeping with the custom of having dessert after meals.

As, however, it was felt that it would be unwise to draw a conclusion from a single experiment, although fifty men were in it, the tabulated results were submitted to statistical analysis to ascertain the probability of the distribution found being due to chance. Of the 43 cases in the two groups to be compared, if one draws a line between the 19 first saturated and the 24 others (that is, between those saturated in the first three days and those taking longer), one has in the first group 4A and 15B, in the second group 18A and 6B. The chance of getting so large a discrepancy, if the numbers in A and B were really proportional, is about 1 : 1,867, so there is no doubt at all of the statistical significance of the difference observed. It can be taken as certainly not due to chance. The only ascertainable difference between the two groups was that men of section A which took longer to saturate had their vitamin C on an empty stomach.

We are indebted to Dr. L. J. Harris for the information that, at a recent Conference on "Wound Healing" organized by the Society for Experimental Biology in Cambridge, it was shown that, if one measures wound healing adequately and quantitatively by a determination of tensile strength, there is an excellent correlation between the level of intake of vitamin C and the tensile strength of the wound. It follows that it is important to know the best conditions for administration of the vitamin in therapeutic doses and that men who go into action with good reserves of vitamin C may come out of hospital somewhat sooner than those who, adequately supplied for normal needs, have no considerable reserve.

Current Literature.

KRUEGER. **Sulphonamides at the Front.** *D. m. W.*, 69, 417. May 28, 1943.

The results achieved by the author were obtained by early operative care in combination with simultaneous sulphonamide treatment both local and general. This experience over all gives unquestionable support to Domagk's prophecy "It can hardly be doubted that sulphonamides will prove effective against wound infection." Every surgeon at the front must now use sulphonamide techniques which are established just as strongly as tetanus prophylaxis and diphtheria serum therapy. The results were obtained under the most wretched environmental conditions and the severest transport difficulties in knee-deep mud, in the dust of the blistering summer, and in the snow storms of the last icy winter with temperatures at 52° C.

Out of 40,000 cases one found, for example, 1,168 skull wounds, of which 730 had been treated in a main dressing station. One hundred and fifty died, corresponding to a mortality of 20·5 per cent, while G.S.W. skull of the last war showed a mortality of 44·6 per cent. Of 1,150 thoracic wounds, 1,033 had treatment up the line and 102 of these died there, i.e. 10 per cent mortality. After transfer to base hospitals up to the time of transport home, a further 2·6 per cent died, making the total mortality 12·6. For similar cases in the last war, the figure was 47 per cent. Of 968 abdominal wounds, 711 were treated and of these 247 died at the front showing a mortality of about 35 per cent. After transport to the rear, another 5·5 per cent died making a total mortality of 40·3 per cent. Again the relative figure for the last war was 67·8 per cent. Of 192 cases of gas gangrene, the author only lost 36, that is 18·7 per cent as opposed to 30 per cent mortality in 1914-18.

LISNEY, A. A. **An Epidemic of Dysentery in a Leicestershire Village.** *Med. Officer.* 1942, Feb. 28, v. 67, No. 9, 70-71.

An outbreak of dysentery, associated with an organism of the Flexner group, occurred in December, 1939, to March, 1940, in Croft, a Leicestershire village. Eleven cases were seen between December 15 and 20, another 55 between December 22 and January 4; there was another peak, 18 cases, between February 6 and 13, and the last case was notified on March 30. Altogether 111 were attacked out of a population of only 1,150. The duration of illness varied from two days to over five weeks. There were three deaths, one in the 10-15 age group and one each in 55-60 and 75-80 age group; 47 were under 20 years of age and 26 under 10 years. Epidemiologically, the evidence pointed to some food as the source, but careful and repeated examinations of water and various articles of food failed to determine the origin of the infection.

H. H. S.

Reprinted from "Bulletin of Hygiene," Vol. 17, No. 5, 1942.

TAYLOR, R. M. & DREGUSS, M. **Influenza Virus Studies during the 1939 Epidemic in Central Europe.** *J. Infect. Dis.* 1941, Jan.-Feb., v. 68, No. 1, 79-89, 3 figs. [14 refs.]

In this paper the authors describe work done in connexion with an outbreak of influenza in Budapest in the winter of 1938-39. The clinical type of the disease was generally mild, but a few rapidly fatal pneumonias were reported. Few ferrets were available, so the selection of material for laboratory examination had to be limited. Twenty-nine specimens were tested in ferrets and influenza virus identified in 16 (14 from throat washings, 1 from a throat swab and 1 from lung tissue). Virus was not isolated from any of the 7 persons who developed no immune response to a known influenza virus strain. The geographical origins of the 16 strains were widespread, 2 from Warsaw, 2 from Prague, 12 from Hungary. All but one of the strains were adapted to mice without difficulty. Cross-neutralization tests showed good neutralization of Budapest 1939 (2 strains) by PR8 (American virus) but little affinity with W.S. (English). An immune ferret serum of the 1939 strains neutralized W.S. and PR8 to a much lesser degree than the homologous viruses, sera of convalescent patients did not, however, bring out any well-defined specificity. A possible explanation is that human beings having had more frequent exposure to influenza than ferrets have a more heterologous production of antibodies. This may be of importance. "If following an influenzal attack there is a rise in antibodies to all strains of the virus, experience so far confirms, it is unnecessary to employ a number of different strains for serological diagnosis" [but see *Bulletin of Hygiene*, 1941, v. 16, 379, 380].

M. GREENWOOD.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

SASANO, K. T., CALDWELL, D. W., NEEDHAM, E. L. & MEDLAR, E. M. **Demonstration of Tubercle Bacilli. A Comparative Study of Culture and Guinea Pig Inoculation.** *Amer. Rev. Tuberculosis.* 1941, Feb., v. 43, No. 2, 263-73.

A total of 1,270 specimens of material of various kinds from human sources, in the majority of which tubercle bacilli were not found in films, were examined for them by both guinea pig inoculation and culture. Concentration and the destruction of other bacteria were achieved by treatment with 4 per cent NaOH, followed by neutralization and repeated centrifugation. Two culture media were used for each specimen, a modified Petraghani's, which gave a higher proportion of positive results, and a modified Bordet-Gengou. In 141 cases either the guinea pig died prematurely, or the culture was contaminated; in 25 of these (17.7 per cent) the other method gave a positive result, which was thus, as the authors put it, "salvaged." Among 1,129 specimens, in which neither method failed in this way, 211 in all gave positive results, 115 by both methods, 63 in the guinea pig only, and 33 by cultivation only. The advantages of the two methods are discussed and it is concluded that when possible both should be employed in each case.

L. P. GARROD.

Reprinted from "Bulletin of Hygiene," Vol. 16, No. 9.

Reviews.

BROMPTON HOSPITAL REPORTS. Vol. XII. Aldershot: Gale & Polden, Ltd. 1943. Pp. 163. Price 8s. net.

This volume consists of a collection of papers by members of the hospital staff, most of which have already appeared in the medical press. Two papers, one on the study of the bronchial tree and the other describing an interesting clinical problem, have not previously been published.

Tuberculosis in children and young adults is likely to become an important problem in the future and the paper on childhood infection and its relation to adolescent and adult pulmonary tuberculosis is a record of the work of the Brompton Hospital Research Department during the last fourteen years on this important subject. Further information was obtained on the connexion between childhood infection and tuberculous disease in late life by observing cases over a period of years in the follow-up department of the hospital. As some of the cases passed from childhood to adolescence, adult types of lesions began to appear, usually between the ages of 15 and 19. In the majority of cases the appearance of the lesions was not accompanied by clinical disturbance or loss of weight and the period of time between the first appearance of the lesion on the X-ray film and the first symptoms varied between three and five years.

Treatment of symptomless adolescent pulmonary tuberculosis is also discussed and the authors consider that artificial pneumothorax is the correct treatment for these cases.

The Hospital Statistical Report for the years 1939 to 1942 has now been brought up to date and appears in this volume.

VARICOSE VEINS, HÆMORRHOIDS AND OTHER CONDITIONS: THEIR TREATMENT BY INJECTION. By R. Rowden Foote, M.R.C.S., L.R.C.P. London: H. K. Lewis & Co., Ltd. 1944. Pp. 119. Price 12s. 6d.

This useful little book describes the injection treatment of varicose veins, piles and certain other conditions more often treated surgically. Its recommendations are orthodox and its descriptions of technique clear. At the end of each chapter is a short bibliography. The young Army surgeon who is put in charge of a pile and varicose vein clinic will find it a reliable guide.

The first and longest section of the book is devoted to the varicose vein. Mr. Rodney Maingot has written a chapter of distinction on the operative treatment of varicose veins and Mrs. Maingot has contributed some very beautiful photographs of very ugly legs. Part II describes the treatment of piles and in general it follows the practice of the St. Marks School of Proctologists. In Part III Dr. Foote describes with such conviction the injection of hydrocele that even those who have abandoned the method after treating one disastrous case will be tempted to try again. Part IV condemns the injection of herniæ and varicoceles but advocates and describes the injection of ganglia, bursæ, nævi and anal fissures.

It is the object of a review not only to tell the reader what is in a book but to assist the author with suggestions for improving it in the second edition. This book could have been more concise. Consider, for example, this paragraph on page 27:—

“Whilst dealing with the question of solutions it may be mentioned that in the past both sugar and salt solutions have been employed with a measure of success. These have in many respects the ideal qualities required, but their use has not become standardized, as they are unreliable in the degree of thrombosis they produce, and large veins are frequently unaffected even by liberal dosage.”

These 65 words mean: “Sugar and salt solutions have been used, but have been discarded because even in big doses they frequently fail to produce thrombosis.”

On page 24 the author could omit the following advice: "... the decision as to whether surgery or injection should be used" for treatment of a varix "is a matter of experience followed by careful thought after all the necessary tests have been employed." But we are reading the book for guidance as to which cases should be treated by surgery and which by injection and Dr. Foote can assume that we shall use such tests as he recommends; he can also assume that we shall think carefully until experience has so conditioned our clinical reflexes that we shall not need his book.

In describing tests to determine the arterial blood supply of the leg the condition of the posterior tibial pulse is omitted; it is surely of greater importance than the histamine test of De Takats and Quint. Figure 39, illustrating the anatomy of the anal canal, might with advantage be replaced by the diagram of Milligan and Morgan; there is a misprint in its legend. Chapter I needs re-arranging; it jumps from the sites of occurrence of varicose veins in the body and their morbid anatomy to the normal anatomy of the veins of the leg and back again to the ætiology of varicose veins. In describing the injection treatment of bursæ more stress might perhaps be laid on the danger of some bursæ communicating with joints and specific mention made of the semimembranosus bursa.

In the Army varicose veins are injected too frequently and with too little regard to the possibility that they are not the cause of the patient's symptoms. There can be no doubt that the legs of many men and women in uniform would have been better if they had been left alone. But Dr. Foote cannot reasonably be expected to deal with specific Service problems. His attractively produced book could prevent most of the mistakes in injection treatment which one sees in Service patients.

R. S. H.

ESSENTIALS OF SYPHILOLOGY. By Rudolph Kampmeier, A.B., M.D. Oxford: Blackwell Scientific Publications, Ltd. 1944. Pp. xvi+518. Price 25s. net.

The title of this book is singularly apt since everything that the average practitioner ought to know about syphilis is contained therein whilst rare manifestations of the disease and the more highly specialized forms of treatment are either excluded altogether or dealt with very briefly. Dr. Kampmeier's object has been not only to present to the reader a picture of the disease, its diagnosis and treatment, but to point out that unless a high incidence of suspicion is maintained many cases will be missed and to stress the fact that every case is part of a public health problem. The doctor who does not take action to seek out the source of infection and all contacts of every patient with early syphilis who consults him fails in his duty to the community for only so can the problem of stamping out syphilis be tackled with any hope of success. The budding syphilologist will do well to take to heart the lessons which this book teaches, namely, that early syphilis should never be diagnosed without confirmatory pathological evidence, that a positive serum test alone does not necessarily mean syphilis, that diagnosis is often difficult, that treatment is usually long and arduous, and that the education of the patient in what syphilis means is almost as important as treatment of the disease—or rather as a part of it. Diagnosis and treatment are clearly and succinctly set out. Of the numerous illustrations most are excellent and frequent case summaries create a mental picture for the reader which will remain in his mind far longer than would simple generalizations. In addition to the clinical sections there are chapters on the sociological and epidemiological aspects and these add considerably to the value of a book which can be recommended confidently to all practitioners.

T. E. O.

MODERN TREATMENT YEAR BOOK, 1944. Edited by C. P. G. Wakeley, C.B., D.Sc., F.R.C.S. London: The Medical Press and Circular. 1944. Pp. viii+296. 17 plates, 15 illustrations. Price 15s.

Books which consist of a collection of articles by different authors are always uneven in quality. This book shows the trait to a marked degree. Some of the articles are excellent but some seem to have been written by tired men in a hurry. There are 42 chapters in

the book, 14 on medical and 28 on surgical subjects, 21 dealing with war medicine and surgery. If the articles had been further grouped, reference would have been facilitated. Most contributions should have been shortened and more chapters included, the former an easy task which might have begun with the deletion of Mr. Fitzwilliam's second sentence which reads: "The mouth is the orifice by which so many functions are carried out, such as speaking, feeding, and, largely, breathing, all of which are being constantly performed, that anything which interferes with these functions seriously affects the comfort and well-being of the individual." Most of us must have discovered this profound truth earlier in the century. It is remarkable that the word penicillin should not figure in the index of a modern treatment year book and that no chapter should be devoted to chemotherapy, the recent work on control of wound infections, nor skin grafting.

There are some excellent résumés, notably those dealing with Malaria by Lieutenant-Colonel F. Murgatroyd, with Epidemic Dysentery by Sir P. Manson-Bahr, with Venereal Disease by Colonel L. W. Harrison, with Renal Calculus by Mr. E. W. Riches, with Carcinoma of the Cervix by Mr. Victor Bonney, with Carbuncle by Mr. H. Wapshaw and with Abdominal Injuries of War by Mr. Rodney Maingot. There are some surprising statements in some of the sections. Mr. Lockhart-Mummery thinks that amoebic dysentery can be cleared up with a few doses of emetine: he must have been lucky in the cases he has encountered. Mr. Alan Perry advocates the Braun splint for some fractures of the femur. Sir Lancelot Barrington-Ward describes in detail the operation for hypertrophic pyloric stenosis but omits the details of the post-operative feeding schedule which is so important for success. Dr. Louis Minski overlooks cysticercosis as a cause of epilepsy, a most important matter for men who have served in India and are being assessed for pension. Mr. Alex Mitchell, when treating osteomyelitis, judges the degree of saturation of the patient with sulpha drugs by the cyanosis and tendency to vomiting; and he gives as much as 18 grams of sulphathiazole per twenty-four hours. This sounds a dangerous dose. Mr. Lionel Norbury writes an excellent chapter on the treatment of piles in recruits but how the treatment of this almost universal and most distressing complaint differs in recruits and ordinary mortals is not made clear. Mr. Norbury says that external piles should not be injected because sloughing and abscess formation are likely. Surely an equally important reason is that intense pain is caused. It will puzzle hospital Quarter-Master's how to recover the metal dilator which Mr. Norbury gives to each patient for a fortnight after he leaves hospital.

The most remarkable chapter in the book is that on Staphylectomy by A. E. Ewens of Atlantic City. The operation, which the author describes as an epochal antecatharrhal innovation, consists of removal of the uvula and it cures colds and sinusitis. The article is garnished with a photograph of eighty recently removed uvulae, arranged in a manner reminiscent of a game-keeper's larder. But the operation would carry us along with more conviction if the testimony of even one disciple had been added to the twenty articles by the author in the bibliography. The journals in which the author's articles have appeared emanate from India to Warsaw and from Reno to the Philippine Islands: seed falling so widely will doubtless find fertile soil somewhere.

NOTABLE NAMES IN MEDICINE AND SURGERY. By Hamilton Bailey, F.R.C.S., and W. J. Bishop, F.L.A. London: H. K. Lewis and Co., Ltd. 1944. Pp. viii+202. Price 15s. net.

This short volume gives biographical notes, with photographs, of eighty members of the Medical and Allied professions whose names are connected with diseases, operations, instruments and medical and surgical procedures in everyday use. The volume is of considerable general interest, and also of use to the student. Examiners have been known to ask a candidate who mentions names such as Syme, Pott, Spencer Wells, who these gentlemen were and where they came from.

Many names might be included, of course, but it is suggested that Harvey, Bassini, McEwen and Robert Jones amongst others might be considered.

J. M. W.

Correspondence.

ROYAL ARMY MEDICAL CORPS OFFICERS' WIDOWS' AND ORPHANS' FRIENDLY SOCIETY.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Since the commencement of hostilities numerous inquiries from Officers of the Royal Army Medical Corps regarding membership of the R.A.M.C. Officers' Widows' and Orphans' Friendly Society have been received by the Committee of Management.

It is felt that the reasons why the Committee of Management are not at present in a position to accept new members should be made known to all regular Officers who are not members of this Society.

I should therefore be very grateful if this letter and the explanatory note below could be published in an early edition of the Corps *Journal*.

85, Eccleston Square,
London, S.W.1.
October 6, 1944.

I am, Sir,

Your obedient Servant,

D. B. McGRIGOR,
Secretary.

At the outbreak of War in September, 1939, the Committee invited Mr. A. D. Besant, F.I.A., the Society's Actuary, to submit his views as to the course to be pursued with regard to admission of new members during the war period.

In reply, he pointed out that the Committee of Management had a free hand, subject only to two conditions :—

(i) That a permanent commission is essential.

(ii) That Rule 7, para. 10, lays down that in the case of those likely to be exposed to war risks in the near future, the Committee of Management in its absolute discretion may accept such a new member on payment of such extra charge to cover war risks, as, on the advice of the Actuary, it may determine.

He further pointed out that in the event of death of such a newly enrolled married member, benefits under the Rules are guaranteed and would involve first the £300 death claim, and secondly the provision for paying widows' pensions and orphans' benefits prematurely; the latter constitutes by far the larger liability. Thus, a single death may involve a liability in the neighbourhood of £1,200 to £1,500. As it was not practicable to fix an extra premium commensurate with a risk of this magnitude, he felt compelled to advise that new entrants should not be admitted during the continuance of hostilities and that the Society should thus fall into line with the general procedure adopted throughout the Life Assurance world.

In March of this year, 1944, the question as to whether the time had now come for again opening the Society's Membership to Regular R.A.M.C. Officers was again submitted to Mr. Besant, and he was informed that the Committee of Management was particularly anxious to do so if it was financially possible.

In reply he was only able safely to advise that the cost of any claim imposed by a new married member remained as prohibitive as before, and that its magnitude was such that, in justice to the rights of existing members, it should not be incurred. Since then the development of the war in the West has made any change in the present procedure additionally hazardous and his statement above is still applicable.

The next statutory Quinquennial Valuation of the Society will be made at the end of 1945, when the position will be reviewed again. If the war should end during the interval between now and the end of 1945, the necessary recommendations for the resumption of

admission have already been made by Mr. Besant and new rates of admission have been registered under the Act and inserted in the Rules.

Any further information may be obtained from the Secretary of the Society, 85, Eccleston Square, London, S.W.1.

**THE INCORPORATED
SOLDIERS, SAILORS AND AIRMENS HELP SOCIETY.
LORD ROBERTS MEMORIAL WORKSHOPS.**

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—May I, on behalf of the Executive Committee, through your courtesy, remind your readers of the work of the Lord Roberts Memorial Fund and Workshops. Our godfather, that great little Field-Marshal, was born on September 30, 1832. There is no chance of his being forgotten as a soldier, but we hope that the fine work being done in our factories by disabled men in our three great fighting Services will help to keep his memory green on his birthday. He himself took a very special interest and delight in this particular work as giving just the help that every self-respecting man appreciates more than any other form of assistance. This is borne out by our experience in six different centres over many years.

During the present War our factories have been, and are, engaged chiefly on work essential to the war effort. During 1943 our turnover was £123,000 and wages amounting to £49,000 were paid.

In our principal factory in London, the total number of disabled men employed has amounted to 113 with an average disability of nearly 59 per cent. Of these 39 have lost an arm and 51 have lost a leg or the use of one. The hours of work have never exceeded 45 per week.

Our other factories are situated in Liverpool, Colchester, Edinburgh, Inverness and Dundee. Provided we can obtain the necessary funds, we mean to extend greatly our work of training and employing men in all Services who find it impossible to obtain work in civil life on account of their war disabilities. We would, therefore, beg any of your readers who are interested in this method of showing their appreciation of the gallant devotion of our fighting men during the present War to spare us what they can, by subscription or legacy, or both, to further the range of our proven work. More than ever, in the years ahead, will this practical sympathy be needed.

Contributions sent to the Hon. Treasurer, Admiral of the Fleet Lord Keyes, Lord Roberts Memorial Workshops, 122, Brompton Road, Room T, London, S.W.3, will be gratefully acknowledged.

*Appeals Department, Head Office,
122, Brompton Road,
London, S.W.3.*

September 30, 1944.

Yours truly,
W. F. FURSE,
Lieutenant-General.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps and articles of a non-scientific character may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W.1."

MANAGER'S NOTICES.

The Annual Subscription for the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is £1 payable in advance. Single copies, 2s. 6d. per copy.

Cheques, etc., should be made payable to the "Journal R.A.M.C.," and crossed "Holt & Co."

Communications in regard to subscriptions, change of address, etc., should be addressed "THE MANAGER, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.2, War Office, Whitehall, S.W.1."

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the Journal should not be taken as an indication that they are necessarily available for export.

ADVERTISEMENTS.

Communications regarding Advertisements should be addressed—
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JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

JULY, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

June 15, 1944.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Harvey Harding Kenshole (45149), Royal Army Medical Corps (London, S.W.20).

Capt. (temp. Major) (acting Lt.-Col.) Phillip Lawrence Eric Wood, M.B.E. (65535), Royal Army Medical Corps (Nottingham).

The Military Cross.

Capt. Denis Hugh Robert Montgomery (128376), Royal Army Medical Corps (Chester).

The Military Medal.

7260308 Cpl. John Osbon, Royal Army Medical Corps (West Hartlepool).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in the field :—

The Military Medal.

7517831 W.O. Class II (Qmr.-Sjt.) Henry Eric Holmes, Royal Army Medical Corps.

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the field :—

Royal Army Medical Corps.

7518944 Sjt. T. Mackie.

7348754 Pte. L. H. Hughes.

5336523 Pte. L. F. G. Watts.

June 22.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in Burma :—

The Distinguished Conduct Medal.

7519992 Sjt. Thomas James Myles, Royal Army Medical Corps (Ballyshannon, Co. Donegal).

June 22.—The KING has been graciously pleased to confer The Efficiency Decoration upon the following officers of the Territorial Army :—

Royal Army Medical Corps.

Col. (temp. Brig.) J. S. Fulton (39518).

Lt.-Col. J. A. Hooker (52330).

Major (temp. Lt.-Col.) W. M. Arnott, M.C. (42328).

Major (temp. Lt.-Col.) C. E. W. Bower (33273).

Major (temp. Lt.-Col.) F. H. Hollingshead (40036).

Major A. D. Briscoe (40787).

Major E. R. C. Walker (35535).

June 29.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Military Cross.

Capt. (temp. Major) Edward Frank Claridge, M.B. (125279), Royal Army Medical Corps.

Capt. (temp. Major) Vivian James Downie, M.B. (85900), Royal Army Medical Corps (London, S.W.1).

Capt. John Henry Brown, M.B. (221400), Royal Army Medical Corps (Motherwell).

Capt. Edward John D'Arcy (173842), Royal Army Medical Corps (Attd. Special Service Troops) (Bournemouth).

Capt. Gwilyn Evans David (104502), Royal Army Medical Corps (Swansea).

Capt. William Lamb, M.B. (205603), Royal Army Medical Corps (Huntingdon).

Capt. Charles Jarvis Mill-Irving (77820), Royal Army Medical Corps.

Capt. George Eustace Pinkerton, M.B. (223982), Royal Army Medical Corps (Hitchin, Herts).

Capt. Elston Grey Turner (241264), Royal Army Medical Corps (Taplow, Bucks).

The Military Medal.

7349119 Sjt. George Poulton Brown, Royal Army Medical Corps (Burton-on-Trent).

7518988 Sjt. Raymond Hawtree Hitchcock, Royal Army Medical Corps (Southall).

3385937 Sjt. John James Whittington, Royal Army Medical Corps (Horsham).

July 7.—The KING has been graciously pleased to sanction the following promotions in, and appointments to, the Venerable Order of the Hospital of St. John of Jerusalem :—July 1, 1944.

As Knights.

Lt.-Gen. Sir Alexander Hood, K.C.B., C.B.E., K.H.P.

As Officers (Brothers).

Brig. Sir William Stewart Duke-Elder, M.B., F.R.C.S.

Major Charles Edward Bull, M.B.E., D.C.M., R.A.M.C.

June 16.—Col. (temp. Brig.) R. W. Galloway, D.S.O., O.B.E., M.B. (5839), late R.A.M.C., is granted the actg. rank of Maj.-Gen. March 14 to May 6, 1944.

The undermentioned officers (short service comms.) are appointed to permanent comms. retaining their present seniority :—

May 1, 1944 :—Capt. J. G. Peacock (89951), Capt. F. D. Fitz G. Steede (89980).

June 30.—War Subs. Major R. F. Barbour (127606), R.A.M.C., to be a Consultant and is granted the local rank of Brig. July 1, 1943.

July 4.—Lt. (Qmr.) (War Subs. Capt. (Qmr.)) J. H. Plumridge, *M.B.E.* (76461), to be Capt. (Qmr.), July 2, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.)) W. C. Ross, *D.C.M.* (76581), to be Capt. (Qmr.), July 3, 1944.

July 7.—Lt.-Col. F. M. Lipscombe, *M.R.C.P.* (12480), relinquishes the local rank of Brig., April 12, 1944.

July 14.—Lt. (Qmr.) (War Subs. Capt. (Qmr.)) J. E. McNeill, *D.C.M.* (76542), to be Capt. (Qmr.), July 14, 1944.

Regular Army Reserve of Officers.

General List.

June 23.—Col. J. Heatly-Spencer, *C.B.E.*, *M.D.*, *F.R.C.P.* (4295), late *R.A.M.C.*, having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., April 24, 1944. (Substituted for the notifi. in *Gazette* (Supplement) dated May 19, 1944.)

THE ARMY DENTAL CORPS.

July 4.—Capt. (temp. Major) R. H. Green (63250) to be Major, July 2, 1944.

ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

Copies of replies received from Prisoners of War and their relatives in acknowledgement of parcels sent by the Comforts Guild.

12.4.1943 : P.O.W., W. H. E. writes : " Many thanks for the parcel of clothes that I received on the 9th. I also had one from you the week before. I am now well off for clothes. Some of the lads were short of a thing or two so I shared the second parcel among them. We are all looking forward now with a smile."

14.6.1943 : P.O.W., J. B. writes : " In acknowledgement of parcel received on 3.6.43, which arrived at a very opportune moment as most of the contents were urgently required. I also wish to thank you ever so much. Kindly convey my best thanks and good wishes to all personnel of the Corps who may have contributed to the Fund."

28.8.1943 : P.O.W., H. F. T. writes : " I received your parcel of clothing dated 2nd June of this year. It was a pleasant surprise to me being my third clothing parcel as a prisoner. Please convey to the members of the Organization my sincere thanks."

26.9.1943 : P.O.W., C. M. writes : " First of all, please excuse my not writing to you before owing to the shortage of cards and also thank you very much for sending the parcels I have been receiving of late ; altogether I have had 2 clothing, 2 book and 2 cigarette parcels during the past two months for which I am very grateful."

2.10.1943 : P.O.W., A. T. writes : I am writing to you to thank you for the clothing parcel which I received from you on 27 September. It was the first parcel of clothing I had received since 1941, and I certainly appreciate your kindness."

21.12.1943 : P.O.W., J. H. M. writes : " Please accept most sincere thanks for 2 fag parcels received

9/12/43 and 21/12/43 respectively. I might say the cigs arrived at a most opportune moment. Imagine Tommy minus fags. Best wishes."

15.11.1943 : C.S.M., J. F. writes : " I wish to acknowledge receipt of next of kin parcel despatched on 14.7.43 addressed to Sgt. A. J. S. repatriated and to inform you that in accordance with his wishes it has been distributed to needy cases."

28.11.1943 : P.O.W., J. D. writes : " Many thanks for your clothing parcel dated Aug. 30th and I received it on the 25 November. And I also received just over a week ago a cigarette parcel from the same address as your *R.A.M.C.* Comforts Guild and I wrote a card of thanks last week. So with many thanks once more."

12.12.1943 : P.O.W., W. T. C. writes : " Please accept this card as a token of my thanks for the cigarettes which you kindly sent me. I thank you one and all for your great kindness and thoughts. Also may I take this opportunity of wishing you all the best in your great effort."

11.4.1944 : Mrs. D. writes : " I wish to thank you very much for sending my husband a parcel. It was a great help to me. Also thank you for sending me a list of the contents. I am enclosing a postal order which I hope will help just a little to show my gratitude."

Mrs. W. writes : " I feel I must write and thank you very much for the letter and list of the contents of the parcels you so kindly send my son. I am most grateful to you all. I have heard from my son. He has told me of all the parcels being sent to him and he is very pleased . . ."

*R.A.M.C. Headquarters Mess,
Millbank, London, S.W.1.
April, 1944.*

DEATHS ON ACTIVE SERVICE.

MAITLAND, Major R. R. Died of wounds, N.W. Europe.

LAURIE, Capt. J. D. Killed in action, N.W. Europe.

BLACKHAM, Capt. C. A. Died of wounds, Italy.

BERGER, Capt. B. D. Died in Libya.

BLACK, Lt. W. H. Died of wounds, Home ex N.W. Europe.

GREEN, Lt. S. M. Killed in action, N.W. Europe.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

AUGUST, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

July 20, 1944.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

The Military Cross.

Captain Ernest John Bowmer, M.B., M.R.C.S. (139127), Royal Army Medical Corps (Wirral).
Captain David Hugh McCollum, M.B. (195206), Royal Army Medical Corps (Coleraine).
Captain Ferdinand Zangen (260190), Royal Army Medical Corps (Haifa, Palestine).

The Military Medal.

7375323 Sgt. Stanley Arthur Baldy, Royal Army Medical Corps.
7344636 Cpl. Joseph Ronald Cooper, Royal Army Medical Corps (Liverpool 14).
7374983 Cpl. Eric Holley, Royal Army Medical Corps (London, S.W.1).
7390121 L/Cpl. James Wilson McNeill, Royal Army Medical Corps (Dunoon, Argyll).
7517854 Pte. John Cain, Royal Army Medical Corps (Salford, Lancs).

July 27.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma:—

The Military Cross.

Capt. (temp. Major) Richard Kendall Pilcher (100999), Royal Army Medical Corps (Bournemouth).
Capt. Frederick Richard Glover, M.B. (248048), Royal Army Medical Corps (Buckhurst Hill, Essex).
Capt. Harry Pozner (101000), Royal Army Medical Corps (London, W.C.1).

The Military Medal.

7264093 Sgt. David Hugh Dalby, Royal Army Medical Corps (Harrogate).
7370578 Cpl. Richard Hugh Hughes, Royal Army Medical Corps (Llandudno).

July 28.—The KING has been pleased to grant unrestricted permission for the wearing of the following decoration, which has been conferred on the undermentioned officer in recognition of distinguished services in the cause of the Allies:—

*Decoration conferred by the President of the
United States of America.*

Legion of Merit. Commander.

Maj.-Gen. Sir Ernest Cowell, K.B.E., C.B., D.S.O., T.D., M.D., F.R.C.S. (2804), Territorial Army.

August 3.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in Italy:—

The Military Medal.

7379098 L/Cpl. Eric James Humphries, Royal Army Medical Corps (London, S.W.12).

August 3.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the field:—

The Military Cross.

Capt. Austin George Hower (136556), Royal Army Medical Corps.

The Military Medal.

2054695 W.O. Class II (Qmr.-Sjt.) John Greig, Royal Army Medical Corps.

August 17.—The KING has been graciously pleased to confer The Efficiency Decoration upon the following officers of the Territorial Army:—

Royal Army Medical Corps.

Col. J. Melvin, O.B.E., M.C. (51561).
Lt.-Col. (temp. Col.) E. C. Woodhead (41378).
Lt.-Col. E. H. Brindle (42412).
Lt.-Col. F. J. Morris, M.C. (25978).
Major (temp. Lt.-Col.) W. A. Ball (40260).
Major (temp. Lt.-Col.) W. C. Barber (44260).
Major (temp. Lt.-Col.) F. A. Bevan (40928).
Major (temp. Lt.-Col.) J. F. Fraser (34675).
Major (temp. Lt.-Col.) H. H. Kenshole (45149).
Major (temp. Lt.-Col.) J. K. Reid (47371).
Major M. R. Frazer (44353).
Major G. N. Frizell (47891).
Major E. G. Snaith, M.C. (39948).
Major C. N. Vaisey (50098).
Capt. (temp. Major) J. A. S. Brown (40329).

July 18.—War Subs. Major T. C. Hunt, D.M., F.R.C.P. (127647) (R.A.M.C.), to be a Consultant and is granted the local rank of Brig., April 12, 1944.

July 25.—Capt. L. C. Card, M.D. (65784), to be Major, June 14, 1944.

Capt. R. A. R. Topping (90097), short Service Officer, is apptd. to a permanent commn., July 1, 1944, retaining his present seniority.

Major A. N. Dickinson, M.C., M.B. (175277), Ind. Med. Services (retired), on ceasing to be empld. with the R.A.M.C., July 26, 1944, on account of ill-health, is granted the rank of Lt.-Col.

August 1.—Col. (temp. Brig.) (acting Maj.-Gen.) H. C. D. Rankin, C.I.E., O.B.E., M.B., V.H.S. (8129), late R.A.M.C., to be temp. Maj.-Gen., June 1, 1944.

Lt. (Qmr.) (War Subs. Capt. (Qmr.)) W. H. E. Hill (76706) to be Capt. (Qmr.), Aug. 2, 1944.

August 8.—Col. N. Cantlie, M.C., M.B., F.R.C.S. (4217), late R.A.M.C., to be D.D.M.S. of a Comd. and to be granted the acting rank of Maj.-Gen., Jan. 18, 1944.

MARRIAGE.

MORTON—ASKHAM.—On July 27, 1944, at Chester-ton, Oxon., Major Ian H. C. Morton, R.A.M.C., only son of Col. H. M. Morton, C.B.E., D.S.O., late R.A.M.C., and Mrs. Morton, of Berwick-

upon-Tweed, to Josephine Sarah, eldest daughter of the late Mr. J. Harvey Askham and Mrs. Askham, of Craigweil, Sussex.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

Capt. L. J. H. Burton, Italy.
Capt. W. E. Church, N.W. Europe.

Missing.

Temp. Lt.-Col. D. H. Thompson, N.W. Europe.

Lt.-Col. W. M. Oxley, N.W. Europe.
Temp. Major J. S. Darling, N.W. Europe.
Capt. R. S. Holtan, N.W. Europe.
Capt. D. H. Nelson, N.W. Europe.
Lt. (Qmr.) R. F. Harder, N.W. Europe.
Capt. R. A. B. Kinloch, Burma.

DEATHS ON ACTIVE SERVICE.

BARCLAY, Capt. J. W. Died, Home.
HEARNE, Capt. J. P. Killed in action, N.W. Europe.
HOOD, Capt. S. C. Killed in action, N.W. Europe.
THOMPSON, Capt. J. R. O. Presumed killed in action at sea.
McNAMARA, Capt. R. W. Presumed killed in action at sea.
NOTMAN, Lt. T. Died of wounds, Italy.
MANN, Major C. P. Died in India.
HILL, Capt. I. M. Died in West Africa.

RAMAGE, Capt. A. Died of wounds.
WELLS, Capt. H. A. Died of wounds, N.W. Europe.
HALPERN, Lt. D. Killed in action, N.W. Europe.
ROTHERHAM, Capt. E. B. Presumed killed in action at sea.
FRANKLIN, Major R. J. Died, Home.
WADDELL, Lt. R. R. Killed in action, N.W. Europe.
LLOYD, Capt. F. H. Died, N.W. Europe.
EVES, Lt.-Col. T. S. Presumed killed in action at sea.

DEATHS.

EVES, Lieutenant-Colonel Thomas Swan.—The loss of Lieutenant-Colonel T. S. Eves, R.A.M.C., who was reported "missing at sea," is a sad end to a life which has been distinguished by whole-hearted service as a medical officer in the Army.

He was born in 1884 and graduated M.B. Dublin in 1907. Joining the Corps in 1908 he saw active service in Gallipoli, Egypt and France. He was awarded the D.S.O. in January, 1918, for distinguished service and a bar to his D.S.O. in July, 1918, for conspicuous gallantry and devotion to duty. He was in charge of an Advanced Dressing Station which was being heavily shelled by the enemy and he personally and thoroughly carried out a complete change of organisation. Later, he was superintending the loading of ambulance cars near a railway bridge, which was a special target for the enemy's guns, and though twice thrown over and bruised by bursting shells he stuck to his post till all the wounded had been dressed and evacuated. His fine performance under continuous shell-fire till the enemy were close upon him was a splendid example to all.

Lieutenant-Colonel Eves rejoined on mobilization in September, 1939, and was notified "missing at sea" in January, 1944. He was awarded the 1914-15 Star, the British War and Victory Medals, and the 1939-44 medal.

A friend writes :—"The passing of 'Paddy'

Eves will leave a sad gap in the Corps. He belonged to the select company of officers who was never spoken of except in terms of respect and affection and it is safe to say that none of his wide circle of friends ever heard a harsh or ill-natured word fall from him. His loyalty to the Corps was intense and he will be sadly missed by many hundreds of all ranks, whose consolation it will be that he died gloriously at the post of duty."

McMUNN.—In Bristol on Aug. 15, 1944, Lieutenant-Colonel Andrew McMunn, O.B.E., R.A.M.C., Retired. Born Dec. 27, 1872, he took the L.R.C.P. and the L.R.C.S.I. in 1898. Having served as a civil surgeon 189 days he was gazetted Lieutenant, R.A.M.C., June 25, 1901. Promoted Captain June 25, 1904, Major June 25, 1913, Brevet Lieutenant-Colonel Jan. 1, 1918, and Lieutenant-Colonel Dec. 5, 1923. He retired Dec. 27, 1927. He served in the South African Campaign in 1901 and 1902 taking part in the operations in the Transvaal, Orange River Colony and Cape Colony and was awarded the Queen's Medal with five Clasps. In the Great War he served in Gallipoli, Egypt and East Africa. Thrice Mentioned, he received the O.B.E., Brevet of Lieutenant-Colonel, 1914-15 Star, British War and Victory Medals.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

SEPTEMBER, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

August 24, 1944.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Italy :—

To be Additional Commander of the Military Division of the said Most Excellent Order.

Brig. (temp.) Stanley Arnott, *D.S.O.*, *M.D.* (4215), late *R.A.M.C.*

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Major (Temp. Lt.-Col.) William Carson Alford, *M.B.* (88813), *R.A.M.C.* (Rutherglen Lanarkshire).

Major (Temp. Lt.-Col.) Reginald Armstrong, *M.B.* (88815), *R.A.M.C.* (Northumberland).

Col. Edward Charles Beddows, *M.C.* (8069), late *R.A.M.C.*

Major (Temp. Lt.-Col.) John Archibald Binning, *M.B.* (51028), *R.A.M.C.* (Chislehurst, Kent).

Major (Temp. Lt.-Col.) George William Crimin, *M.B.* (53478), *R.A.M.C.* (Walton-on-Thames).

Major (Temp. Lt.-Col.) Alphonsus Liguori d'Abreu, *M.B.*, *F.R.C.S.* (94581), *R.A.M.C.* (Llandaff, Cardiff).

Major (Temp. Lt.-Col.) Ian Dalglish Easton (87179), *R.A.M.C.* (Edinburgh).

Col. (Temp.) Cuthbert Edward Eccles (35619), *R.A.M.C.*

Major (Temp. Lt.-Col.) Clifford Douglas Evans, *M.B.* (31739), *R.A.M.C.* (Bristol).

Major (Temp. Lt.-Col.) James Leslie Gordon (65315), *R.A.M.C.*

Col. (Acting) Joseph Walker Hurst, *T.D.* (25284), *R.A.M.C.* (Huddersfield).

Major (Temp. Lt.-Col.) Frederick Haydon Hollingshead, *M.B.* (40036), *R.A.M.C.* (Ilfracombe).

Major (Temp. Lt.-Col.) Alfred Morgan Hughes, *M.C.*, *T.D.* (51565), *R.A.M.C.*

Major (Temp. Lt.-Col.) William Henry Morgan Jones, *T.D.* (35750), *R.A.M.C.*

Major (Temp. Lt.-Col.) Frank Patrick Lee Lander, *M.D.*, *F.R.C.P.* (211973), *R.A.M.C.* (London).

Major (Temp. Lt.-Col.) William Douglas Farncombe Lytle, *M.B.* (61470), *R.A.M.C.* (Southsea).

Major (Temp. Lt.-Col.) Alfred Spearman Pern, *T.D.* (25932) *R.A.M.C.* (Botlev, Hants).

Lt.-Col. Francis Augustus Roddy, *M.B.* (27370), *R.A.M.C.*

Major (Temp. Lt.-Col.) Robert Wedon Scott, *M.B.* (56533), *R.A.M.C.* (Llandovery).

Major (Temp. Lt.-Col.) Edward James Selby (104011), *R.A.M.C.* (London).

Major (Temp. Lt.-Col.) Richard Wainwright Duke Turner, *M.D.*, *F.R.C.P.* (64943), *R.A.M.C.* (London).

Major (Temp. Lt.-Col.) Robert Brash Wright, *M.B.* (99466), *R.A.M.C.* (Wishaw, Scotland).

To be Additional Members of the Military Division of the said Most Excellent Order :—

Capt. (Temp. Major) John Buchanan Barr, *M.B.* (93625), *R.A.M.C.* (Bearsden, Dumbartonshire).

Capt. (Temp. Major) Guy Blackburn, *M.B.*, *F.R.C.S.* (221911), *R.A.M.C.* (London).

Capt. Garnet Henry Midgley Hemsted (153828), *R.A.M.C.*

Capt. Alexander Henderson, *M.B.* (202517), *R.A.M.C.* (Forres, Morayshire).

Capt. (Temp. Major) Clifford David Phillips Jones, *M.B.*, *F.R.C.S.* (136634), *R.A.M.C.*

Capt. (Temp. Major) Ralph Kauntze, *M.B.*, *M.R.C.P.* (102620), *R.A.M.C.* (Dorking, Surrey).

Miss Bessie Olive Sweet Lidstone, *A.R.R.C.* (208623), Sister (Acting Matron), *Q.A.I.M.N.S.* (London).

Capt. (Temp. Major) Douglas Gordon Liversedge, *M.B.* (127142), *R.A.M.C.* (Harrogate, Yorks).

Miss Jane Mansley (266929), Sister, *Q.A.I.M.N.S.* (Liverpool).

7254923 *W.O.II.* (Qm.-Sjt.) (acting Warrant Officer Class I (Sjt.-Maj.)) Alfred Marland, *R.A.M.C.* (Ashton-under-Lyne).

Miss Gwendoline Doris Owen (250858), Sister, *Q.A.I.M.N.S.* (Barking, Essex).

Lt. (Qmr.) (Local Major) Frederick Charles Savory (205084), *R.A.M.C.* (Birmingham).

7523513 *W.O.II.* (Qm.-Sjt.) Charles Frank Stone, *R.A.M.C.* (Aldershot).

Lt. (Qmr.) George Taylor (247450), *R.A.M.C.* (Salisbury).

Capt. (Temp. Major) William Ronald West-Watson (89803), *R.A.M.C.* (Manningham, Yorks.).

7518706 *W.O.II.* (Qmr.-Sjt.) (acting *W.O.* Class I (Sjt.-Major)) Leslie Russell White, *R.A.M.C.* (Teddington, Middx.).

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) to the undermentioned in recognition of gallant and distinguished services in Italy :—

7364688 Pte. Stephen Thomas Baker, *R.A.M.C.* (London).

7379566 Pte. William Vincent Burgan, *R.A.M.C.* (London).

7383105 Cpl. John William Senior, *R.A.M.C.* (St. Albans, Herts).

7538773 Sjt. Leopold Arnold Wheatley, The Army Dental Corps (London).

The KING has been graciously pleased to approve the following immediate awards in recognition of gallant and distinguished services in Italy :—

The Military Cross.

Capt. John Gordon Macarthur, M.B. (104552), R.A.M.C. (Aberdeen).

Lt. Thomas Notman (291917), R.A.M.C. (Troon, Ayrshire).

The Distinguished Conduct Medal.

7535247 Sjt. Horace Roach, R.A.M.C. (Karachi, India).

7259467 Sjt. Thomas William Waterhouse, R.A.M.C. (Newstead, Notts).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Military Cross.

Capt. William Hunter Lang, M.D. (239142), R.A.M.C.

The Royal Red Cross.

To be Additional Members of The Royal Red Cross, First Class :—

Sister (Temp. Matron) Miss Beatrix Ernestine O'Dwyer-Thomas (215042), Territorial Army Nursing Service (London, N.19).

Sister (Temp. Matron) Miss Sarah Alice Wade (206516), Q.A.I.M.N.S. (Leeds).

Sister (acting Assistant Matron) Miss Ursula Adelaide Dowling (206122), Q.A.I.M.N.S. (London, N.1).

Sister (acting Assistant Matron) Miss Winifred Walshe (206532), Q.A.I.M.N.S. (Co. Clare, Eire).

To be Additional Associates of The Royal Red Cross, Second Class :—

Sister (acting Matron) Miss Marjorie Celia Ellis (208027), Q.A.I.M.N.S. (Torquay, Devon).

Sister Miss Joan Margaret Alethea Appleby (209719), Territorial Army Nursing Service.

Sister Miss Kathleen Hilda Letitia Fitzgerald (215932), Q.A.I.M.N.S. (Bristol).

Sister Miss Flora McDonald Barbour (209741), Territorial Army Nursing Service.

Sister Miss Margaret Elizabeth Gilks (213337), Territorial Army Nursing Service (Leamington Spa).

Sister Miss Rhoda Annie Swarbrick (1246137), Q.A.I.M.N.S. (Blackpool).

Sister Miss Theodora Turner (209367), Q.A.I.M.N.S. (Sandacre, Berks.).

The Military Medal.

7261345 S/Sjt. Frederick Edward Reed, R.A.M.C. (Long Eaton, Notts).

7354705 Pte. (acting L/Sjt.) David Thomas McKay, R.A.M.C. (Liverpool).

14373398 Pte. Albert Edward Burden, R.A.M.C. (Pontefract, Yorks).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Italy :—

Maj.-Gen. (acting) R. W. Galloway, C.B.E., D.S.O., M.B. (5839).

Brig. (temp.) W. P. Croker, M.B. (8071).

Major (temp. Lt.-Col.) W. C. Alford (88813).

Major (temp. Lt.-Col.) H. Allan, M.C., M.D. (106817).

Major (temp. Lt.-Col.) W. M. Capper (104037).

Major (temp. Lt.-Col.) R. W. Hendry, M.B., F.R.C.S. (62713).

Major (temp. Lt.-Col.) D. T. Swift (63170).

Capt. (temp. Major) J. W. L. Bain, M.B. (88157).

Capt. (temp. Major) H. J. Bell (89838).

Capt. (temp. Major) H. W. Burge (230346).

Capt. (temp. Major) D. J. Campbell (154351).

Capt. (temp. Major) S. Carter (139673).

Capt. (temp. Major) H. J. Croghan (99453).

Capt. (temp. Major) V. Downiel, M.C., M.B. (85900).

Capt. (temp. Major) P. R. Evans (239253).

Capt. (temp. Major) T. D. W. Fryer (99396).

Capt. (temp. Major) C. C. Hurst (87655).

Capt. (temp. Major) J. Irvine (161275).

Capt. (temp. Major) D. B. Jagger (99110).

Capt. (temp. Major) T. G. S. James, M.B. (74437).

Capt. (temp. Major) J. G. Jamieson (103695).

Capt. (temp. Major) J. W. Litchfield (231689).

Capt. (temp. Major) R. B. Robertson, M.B.E., M.B. (72158).

Capt. (temp. Major) J. McL. Ross (119922).

Capt. (temp. Major) C. V. Salisbury (110698).

Capt. (temp. Major) V. A. J. Swain (216210).

Capt. (temp. Major) N. G. G. Talbot (86207).

Capt. (temp. Major) E. Townsend, M.C., M.D. (107206).

Capt. (temp. Major) W. S. Tulloch (205606).

Capt. (temp. Major) R. H. Webber (66833).

Capt. K. M. Bell, M.B. (99327).

Capt. A. M. Brown (241258).

Capt. N. C. Coombs (103683).

Capt. F. H. Counihan (128964).

Capt. J. Cumming (202094).

Capt. J. S. Davidson (252470).

Capt. T. C. H. Davies (211855).

Capt. W. A. Dewar (236400).

Capt. F. R. Duggan (135364).

Capt. S. M. Gill (231058).

Capt. J. G. Gow (163611).

Capt. C. J. Hodson (244287).

Capt. H. J. Holloway (230343).

Capt. C. W. Marshall (236035).

Capt. R. D. Rutherford (111786).

Capt. R. W. Temple (173017).

Capt. H. A. Wells (111839).

Lt. R. H. Hughes (263445).

Lt. (Qmr.) G. Edwards (231856).

Lt. (Qmr.) H. J. Halfacre (246399).

Lt. (Qmr.) F. W. Mudle (291585).

Lt. (Qmr.) J. Ross (223466).

7249616 W.O. I (R.S.M.) H. R. Anderson.

7517450 W.O. I (R.S.M.) H. Batchelor.

758771 W.O. I (R.S.M.) J. Birch.

772059 W.O. I (R.S.M.) W. Denny.

7258678 W.O. I (R.S.M.) J. E. Proud.

7343969 W.O. I (R.S.M.) P. L. Richards.

7349469 W.O. I (R.S.M.) S. D. Walker.

7346819 W.O. II (Qmr.-Sjt.) (acting W.O. I

(S.M.)) C. H. Johnson.

7258174 W.O. II (Qmr.-Sjt.) acting W.O. I

(R.S.M.) A. E. Mortlock.

7518104 W.O. II (Qmr.-Sjt.) (acting W.O. (S.M.))

A. H. French.

7345306 W.O. II (Qmr.-Sjt.) A. Redfern.

7522167 W.O. II (Qmr.-Sjt.) G. E. Rhodes.

7349976 W.O. II (Qmr.-Sjt.) J. E. Roberts.

7378821 Sjt. (acting W.O. II (Qmr.-Sjt.)) F. G.

Tucker.

7387463 S/Sjt. H. J. D. Bowen.

7377422 S/Sjt. A. D. Caddick.

7348807 S/Sjt. R. Gimblett.

7345224 S/Sjt. E. T. Harris.

7516673 S/Sjt. W. M. Hay.

7522624 S/Sjt. W. H. Karslake.
 3245321 S/Sjt. R. L. Kirkland.
 7521946 S/Sjt. R. Lawson.
 7357965 S/Sjt. J. Morrison.
 7348895 S/Sjt. A. Orr.
 7354798 S/Sjt. E. C. Read.
 7522570 Sjt. (acting S/Sjt.) G. Carter.
 7260554 Sjt. (acting S/Sjt.) W. F. Swinnerton.
 7347983 Sjt. J. F. C. Allchurch.
 4336419 Sjt. W. A. Barnby, *D.C.M., M.M.*
 7360430 Sjt. F. J. N. Butler.
 7516983 Sjt. D. J. Davies.
 5100379 Sjt. E. Drinkwater.
 7354817 Sjt. W. Grant.
 7346575 Sjt. T. McKenzie.
 7358626 Sjt. N. W. Strath.
 7357243 Sjt. A. Tempest.
 7262980 Sjt. W. H. Thorpe.
 7348805 Cpl. (acting Sjt.) V. F. Gerrard.
 7265576 Cpl. (acting Sjt.) M. Lacey.
 7387146 Cpl. (acting Sjt.) W. G. Thomas.
 7260293 L/Sjt. A. Adderley.
 7391289 L/Sjt. E. G. F. Bacon.
 7521488 L/Sjt. G. McGill.
 7363984 Cpl. P. S. Brickett.
 7523385 Cpl. K. A. Brock.
 7260746 Cpl. H. H. Carter.
 7391906 Cpl. H. R. Carter.
 7516784 Cpl. W. J. Mytton.
 7371970 Cpl. R. Roberts.
 7397663 Cpl. T. F. Scott.
 7344723 Cpl. C. Townsend.
 7381784 Cpl. A. Waddington.
 7523176 Pte. (acting Cpl.) C. F. Cordell.
 7364779 L/Cpl. J. Bickerstaffe.
 2568791 L/Cpl. J. Cramer.
 7393609 L/Cpl. I. Curnock.
 7377672 L/Cpl. A. Dolman.
 7404506 L/Cpl. J. W. Garry.
 7521219 L/Cpl. D. Hall.
 7364717 L/Cpl. L. Morton.
 7394597 L/Cpl. H. G. Moseley.
 7518308 L/Cpl. F. J. C. Pimperton.
 7364140 L/Cpl. D. C. Sugden.
 7402758 L/Cpl. T. D. Thomas.
 7265180 L/Cpl. E. W. M. Wilson.
 7390596 Pte. C. P. Andrew.
 7359256 Pte. P. Bianco.
 7392586 Pte. J. Carney.
 7358320 Pte. P. H. Diddams.
 7368373 Pte. A. K. Furniss.
 7401796 Pte. W. R. Gray.
 7523335 Pte. G. Green.
 7380474 Pte. J. Green.
 7378233 Pte. N. Hope.
 7367115 Pte. A. Hurley.
 7400771 Pte. A. Ibbotson.
 7398600 Pte. G. Morey.
 7389233 Pte. H. Moses.
 7249417 Pte. S. A. Orme.
 7400370 Pte. D. Pandolfi.
 10574245 Pte. A. J. Pepperman.
 7387285 Pte. N. Reis Nelson.
 7375505 Pte. H. Rudd.
 7344043 Pte. H. Topliff.
 7347965 Pte. W. A. Woollyven.

Queen Alexandra's Imperial Military Nursing Service.

Miss I. B. Hazlett, R.R.C., S/Sister (temp. Matron) (206207).

Miss S. A. W. Wade, S/Sister (temp. Matron) (206516).

Miss E. C. Blackmore, Sister (225452).
 Miss N. Crookall, Sister (246639).
 Miss M. E. Gordon, Sister (208317).
 Miss F. A. Hansford, Sister (215984).
 Miss W. MacMillan, Sister (221060).
 Miss M. Mitchell, Sister (213133).
 Miss A. K. D. Morgan, Sister (208832).
 Miss O. E. Morris, Sister (234432).
 Miss O. J. Penty, Sister (215390).
 Miss N. Studham, Sister (252868).
 Miss C. M. Wright, Sister (254539).

August 31.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Normandy:—

The Distinguished Service Order.

Major (temp. Lt.-Col.) Donal Maurice Ahern, M.B. (56530), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Edward Ian Bruce Harvey, M.B. (33854), Royal Army Medical Corps (Edinburgh).

Capt. (temp. Major) Alastair Donald Young, M.B. (128689), Royal Army Medical Corps (Glasgow).

Bar to the Military Cross.

Capt. (temp. Major) Percy Keyte Jenkins, M.C., M.B. (85772), Royal Army Medical Corps (Clevedon, Somerset).

The Military Cross.

Capt. (acting Major) Lorenzo Vance MacDonald, M.D. (107773), Royal Army Medical Corps (Edmonton, Canada).

Capt. Gordon Robert Clark, M.B. (266422), Royal Army Medical Corps (Nottingham).

Capt. James Cyril Fraser Cregan (250992), Royal Army Medical Corps (attd. Special Service Troops) (Chapel-en-le-Frith).

Capt. William Ronald Lamb, M.B. (122729), Royal Army Medical Corps.

Capt. Gregory Patrick McGowan, M.B. (202001), Royal Army Medical Corps (Glasgow, W.2).

Capt. John Columban Reginald Nuttall-Smith, M.B. (150026), Royal Army Medical Corps (Lindfield).

Capt. Gordon Spencer Sheill, M.B. (111789), Royal Army Medical Corps (Dublin).

Capt. Peter Hugh Tasker (231980), Royal Army Medical Corps (attd. Special Service Troops).

Capt. James Cowie Thom (118364), Royal Army Medical Corps (Mt. Mangel, W. Australia) (since killed in action).

Capt. David John Tibbs (274140), Royal Army Medical Corps (Totland Bay, I.O.W.).

Capt. Walter Walker Yellowlees, M.B. (234570), Royal Army Medical Corps (Elderslie, Renfrewshire).

Lt. George Maurice Ashurst, M.B. (306709), Royal Army Medical Corps (Wigan).

Lt. David Michael de Reuda Winsor (305697), Royal Army Medical Corps (attd. Special Service Troops) (Southampton).

Capt. Frank Eric Street (89128), Army Dental Corps.

The Military Medal.

7357425 Sjt. William Lurriah, Royal Army Medical Corps (Altrincham).

7403502 Cpl. William Henry Bartle, Royal Army Medical Corps (Nottingham).

7519094 Cpl. William Richard Lusted, Royal Army Medical Corps (Faversham, Kent).

7407321 L.Cpl. Richard McCarthy, Royal Army

Medical Corps (attd. Special Service Troops) (St. Helens, Lancs).

7367051 L/Cpl. John William Thwaytes, Royal Army Medical Corps (attd. Special Service Troops) (Seaton, Cumberland).

735941 L/Cpl. Frederick Barnard Tickle, Royal Army Medical Corps (attd. Special Service Troops) (Heswall Hill, Cheshire).

97003870 Pte. Geoffrey Wollard Brown, Royal Army Medical Corps.

7387288 Pte. Cecil Herbert Moyse, Royal Army Medical Corps (Norwich).

97002557 Pte. George Skelly, Royal Army Medical Corps (Whitehaven, Cumberland).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Burma :—

The Military Medal.

7358807 Cpl. Anthony James O'Brien, Royal Army Medical Corps (London, E.7).

September 14.—The KING has been graciously pleased to give orders for the following appointment to the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in the field :—

To be Additional Member of the Military Division of the said Most Excellent Order :—

Major (temp. Lt.-Col.) John Anderson Chapel, M.D. (35742), Royal Army Medical Corps (Res. of Off.).

September 15.—The KING has been graciously pleased to approve the publication of the names of the undermentioned as having been commended for brave conduct :—

7519527 Qmr.-Sjt. Edward Henry Wilson, Royal Army Medical Corps.

Sister (Miss) Elspeth Abercrombie (206566),

Queen Alexandra's Imperial Military Nursing Service Reserve.

August 15.—Lt.-Col. M. P. Power, O.B.E., M.C. (15671), having attained the age limit for retirement is retained on the Active List supern. to estabtd., Aug. 15, 1944.

August 18.—Lt.-Col. T. J. L. Thompson, M.C. (14379), having attained the age limit for retirement is retained on the Active List supern. to estabtd., Aug. 17, 1944.

August 25.—Major D. W. M. Mackenzie, M.D. (15602), to be Lt.-Col. Apr. 24, 1944.

September 1.—The undermentioned Majors (War Subs. Lt.-Cols.) to be Lt.-Cols. :—

June 6, 1944.—F. Holmes, O.B.E., M.B. (1589).

Aug. 15, 1944.—L. Handy (1981).

Aug. 17, 1944.—M. J. Whelton, M.D. (5204).

The undermentioned short service offrs. are apptd. to permanent commns. retaining their present seniority :—

Capt. C. D. Salmond (99323), Sept. 1, 1944.

Capt. I. D. Paterson, M.B. (99318), Sept. 1, 1944.

Capt. G. E. Gray, M.B. (66505), Sept. 1, 1944.

Capt. F. J. Ingham, M.B. (78910), Sept. 2, 1944.

Capt. D. B. Jagger, M.B. (99110), Sept. 3, 1944.

Capt. J. A. Allen, M.B. (100136), Sept. 4, 1944.

September 5.—Major G. A. E. Argo (50524) ceases to belong to the Res. of Offrs. on account of ill-health, Aug. 1, 1944, and is granted the hon. rank of Lt.-Col.

September 8.—Capt. D. S. Milne, M.B. (94929), short service offr., is appt. to a permanent commn., July 7, 1944, and retaining his present seniority. Lt.-Col. F. A. R. Hacker (10652) retires on ret. pay Aug. 24, 1944, on account of ill-health.

September 12.—Major C. Scaife, M.D. (11031), R.A.M.C. Ret. Pay, is restored to the rank of Lt.-Col. on ceasing to be employed. Sept. 1, 1944.

DEATHS ON ACTIVE SERVICE.

RAINER, Major C. F. Died in U.K.

LAWTON, Capt. J. H. T. Died of wounds, N.W. Europe.

CONWAY, Capt. S. Died, accident U.K.

FISK, Capt. A. D. Killed in action, N.W. Europe.

THOM, Capt. J. C. Killed in action, N.W. Europe.

HOLTAN, Capt. R. S. Prisoner of War.

CARRICK, Capt. R. J. O. Killed in action. N.W. Europe.

PHILIP, Capt. J. Accidentally killed in Italy.

WAINMAN, Capt. F. M. Killed in Action. N.W. Europe.

MISSING.

COLLIER, Lt. W. A. L. N.W. Europe.

BINNINGTON, Capt. P. N.W. Europe.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

OCTOBER, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

September 21, 1944.—The KING has been graciously pleased to confer The Efficiency Decoration upon the following officers of the Territorial Army:—

Royal Army Medical Corps.

Lt.-Col. A. M. Campbell (41791).
Lt.-Col. D. P. Levack (30108).
Major (temp. Lt.-Col.) M. Delacy (41583).
Major (temp. Lt.-Col.) H. G. Garland (41274).
Major (temp. Lt.-Col.) W. E. Orchard (40122).
Major J. C. C. Howe (27791).
Major R. G. Morrison (38459).
Major ((Qmr.) J. H. Tomson (40375) (T.A.R.O.).
Major L. D. Williams (40000).
Capt. (temp. Major) C. S. France (40904).

The Army Dental Corps.

Capt. (temp. Major) F. J. H. Edmonds (41983) (T.A.R.O.).

September 28.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the field:—

Royal Army Medical Corps.

7360438 Pte. D. H. Edwards.
7344977 Pte L. N. Wyatt.

October 5.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in the field:—

The Distinguished Conduct Medal.

7375194 L. Cpl. John Denis Howard, Royal Army

Medical Corps (attd. Special Service Troops) (Leeds 8).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Burma:—

The Distinguished Service Order.

Capt. (temp. Major) Desmond Gilbert Cromie Whyte, M.B. (101008), Royal Army Medical Corps (Helens Bay, Co. Down).

September 19.—Major H. S. Moore (15750) having attained the age for retirement is retained on the Active List supern. to estab. July 28, 1944.

September 22.—Col. (temp. Brig.) W. K. Morrison, D.S.O., M.B. (8126), late R.A.M.C., is granted the actg. rank of Maj.-Gen., March 13 to May 7, 1944, incl.

September 29.—Capt. (War Subs. Major) R. Phillipson (65499) to be Major, September 14, 1944.

October 3.—Col. S. D. Reid, M.B. (5716), late R.A.M.C., having attained the age for retirement, to be retained on the Active List supern. to estab., October 4, 1944.

Lt.-Col. C. M. Forster (10764), to retire on ret. pay, August 2, 1944, and to be granted the hon. rank of Col.

Lt.-Col. D. G. Cheyne, C.B.E., M.C., M.D. (14491), from R.A.M.C., to be Col. October 4, 1944, with seniority from October 30, 1941.

October 9.—Lt.-Col. E. E. Holden (15673) to retire on ret. pay on account of ill-health, and to be granted the hon. rank of Col.

THE ARMY DENTAL CORPS.

September 22.—Lt.-Col. (temp. Col.) R. J. Condie (5317), having attained the age of retirement, is retained on the Active List supern. to estab., September 2, 1944.

September 26.—The undermentioned short service officers are apptd. to permanent commns., retaining their present seniority:—

April 5, 1943:—Capt. (temp. Major) F. K. Johnson (71722)

April 19, 1943: Capt. (temp. Major) E. A. Moore (71861)

November 29, 1943:—Capt. (temp. Major) L. K. Caygill (73871).

March 7, 1944:—Capt. (temp. Major) V. Vella-Grech (75002)

March 28, 1944:—Capt. (temp. Major) P. R. W. Harvey (75328).

PRISONERS OF WAR AND MISSING.

Prisoners of War

Temp. Major J. S. Darling, N.W. Europe.
 Capt. P. B. Barker, B.E.F.
 Capt. R. S. Holtan, N.W. Europe.
 Capt. B. B. Hosford, B.E.F.
 Capt. J. R. Odell, B.E.F.
 Lt. (Qmr.) R. F. Harder, N.W. Europe.

Missing.

Lt. W. I. Davies, N.W. Europe.
 Lt.-Col. M. E. M. Herford, N.W. Europe.
 Capt. P. Louis, N.W. Europe.
 Capt. J. W. Logan, N.W. Europe.
 Capt. J. G. Jones, N.W. Europe.
 Capt. E. Haigh, N.W. Europe.
 Capt. R. E. Bonham Carter, N.W. Europe.
 Capt. J. H. Keesey, N.W. Europe.
 Capt. C. A. Simmons, N.W. Europe.

Capt. B. Delvin, N.W. Europe.
 Temp. Major S. M. Frazer, N.W. Europe.
 Capt. C. C. M. James, N.W. Europe.
 Capt. B. C. Jeffrey, N.W. Europe.
 Temp. Major G. Rigby Jones, N.W. Europe.
 Lt.-Col. A. T. Manable, N.W. Europe.
 Capt. T. F. Redman, N.W. Europe.
 Capt. J. E. Buck, N.W. Europe.
 Lt. B. Brownscombe, N.W. Europe.
 Capt. G. B. D. Scott, N.W. Europe.
 Lt. D. H. Randall, N.W. Europe.
 Capt. J. E. Miller, N.W. Europe.
 Capt. D. Wright, N.W. Europe.
 Capt. J. C. Taylor, N.W. Europe.
 Capt. J. Rutherford, N.W. Europe.
 Capt. R. Percival, N.W. Europe.
 Capt. G. F. H. Drayson, N.W. Europe.
 Lt. A. S. Barling, N.W. Europe.
 Col. G. M. Warrack, N.W. Europe.

DEATH OF THE COUNTESS ROBERTS.

It is with the deepest regret that the death of the Countess Roberts has been noted by Queen Alexandra's Army Nursing Board.

Lady Roberts was appointed a member of the Board in 1917 and became Vice-President in 1934. During this long period she rendered an unflagging devotion to the duties of her office. Her intimate acquaintance with the Nursing Service, her under-

standing and her broad outlook made a combination which proved invaluable.

It was due to the efforts of her mother, with the strong support of her renowned father, Field Marshal Lord Roberts, that a Nursing Service for India was instituted, and Lady Roberts carried on the family tradition by devoting her long experience and wide knowledge to the very great advantage of the Nursing Services.

DEATHS.

MOFFITT.—On July 31, 1944, Lieutenant-Colonel Thomas Beattie Moffitt, R.A.M.C., Retired. Born in Co. Fermanagh November 30, 1858, he took the L.R.C.P.I. and L.R.C.S.I. in 1879, and entered the Service as Surgeon March 6, 1880. Promoted Surgeon Major March 6, 1892, and Lieutenant-Colonel, R.A.M.C., March 6, 1900, he retired October 4, 1905. He took part in the Chitral Campaign of 1895 with the Relief Column and was awarded the medal with Clasp.

O'CONNOR.—In Blackrock, Co. Dublin, suddenly, on August 20, 1944, Colonel Arthur Patrick O'Connor, M.C., late R.A.M.C., Retired. Born December 10, 1883, he took the M.B. of the Royal University of Ireland in 1908, and was commis-

sioned Lieutenant, R.A.M.C., July 31, 1909. Promoted Captain January 31, 1913, Major July 31, 1921, Lieutenant-Colonel May 1, 1934, and Colonel April 8, 1938, he retired owing to ill-health October 8, 1938. He served as D.A.D.M.S. to the Rhine Inter-Allied Mission of Control from June, 1922, till January, 1923. Shortly after retiring he took up the Retired Pay appointment of Recruiting Medical Officer in Birmingham, which he held till September, 1939. He was a First Class Interpreter in French and German. He served in France and Belgium from August, 1914, till the end of the war, being mentioned in despatches and awarded the M.C., 1914 Star and Clasp, British War and Victory Medals.

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JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

NOVEMBER, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

October 19, 1944.—The KING has been graciously pleased to give orders for the following appointment to the Most Honourable Order of the Bath, in recognition of distinguished services in connection with the landings in Normandy :—

To be Additional Member of the Military Division of the Third Class, or Companion, of the said Most Honourable Order.

Major-General Robert Eric Barnsley, M.C., M.B., K.H.S. (15324), late Royal Army Medical Corps.

The KING has been graciously pleased to give orders for the following promotion in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

To be Additional Commander of the Military Division of the said Most Excellent Order :—

Colonel (temp.) Ambrose Neponucene Trelawney Meneces, M.B. (44406), Royal Army Medical Corps.

To be Additional Member of the Military Division of the said Most Excellent Order :—

Captain (temp. Major) Douglas Banks Jamie, M.B. (175714), Royal Army Medical Corps (Dundee).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North West Europe :—

The Military Cross.

Capt. (temp. Major) James Gerald Brennan De Vine (101974), Royal Army Medical Corps (Chipping Campden).

Capt. (temp. Major) Richard Wynn Jones, M.B. (115476), Royal Army Medical Corps (Prescott, Lancs.).

Capt. (temp. Major) James Lendrum Nicol, M.B. (89005), Royal Army Medical Corps (Christchurch, New Zealand).

Capt. (acting Major) Donald Ross Sandison (150034), Royal Army Medical Corps (Edinburgh, 7).

Capt. Thomas Grant Gray, M.B. (274680), Royal Army Medical Corps (Stoke on Trent).

Capt. Peter Glyn Griffiths, M.B. (244019), Royal Army Medical Corps (Denbigh, N. Wales).

Capt. Charles Campbell Laird, M.B. (70215), Royal Army Medical Corps (Ormskirk).

Capt. William Wesley Marsden (199167), Royal Army Medical Corps (Worksworth, Derbyshire).

Capt. John Thompson, M.B. (221859), Royal Army Medical Corps (Ramsbottom, Manchester).

Lt. Frank Stanley Cooper (303413), Royal Army Medical Corps (Beckenham).

The Military Medal.

7348967 S/Sjt. Winston Douglas Chipchase, Royal Army Medical Corps (Newcastle-on-Tyne).

7357163 Sjt. Thomas William Gallagher, Royal Army Medical Corps (Newcastle-on-Tyne).

7357523 Cpl. (acting Sjt.) Frederick Charles Samuel Andrews, Royal Army Medical Corps.

7373461 Cpl. (acting Sjt.) Graham Ernest Dyer, Royal Army Medical Corps (Burnham, Bucks).

7377858 Cpl. Robert Jerney, Royal Army Medical Corps (South Wigston, Leicester).

7347249 Cpl. Ralph Huntley Showering, Royal Army Medical Corps (Colchester).

7379317 Pte. (acting Cpl.) Harry Pearce, Royal Army Medical Corps (Nottingham).

7345290 L/Cpl. Stanley Thomas Essex, Royal Army Medical Corps (Birmingham, 11).

7356580 L/Cpl. Cyril Wilfred Farrow, Royal Army Medical Corps (Hull).

7383423 L/Cpl. John Arthur Leadbeater Jesney, Royal Army Medical Corps (att. Special Service Troops), (Hull).

5336379 L/Cpl. Percy George Kendrick, Royal Army Medical Corps (att. Special Service Troops) (Doncaster).

7366060 L/Cpl. John White, Royal Army Medical Corps (Kirkcudbright).

7387261 Pte. Sargent Halls, Royal Army Medical Corps (Brandon, Suffolk).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

The Royal Red Cross.

To be Additional Member of the Royal Red Cross, First Class :—

Matron Miss Amy Dexter (206108), Queen Alexandra's Imperial Military Nursing Service (Coventry).

To be Additional Associates of the Royal Red Cross, Second Class :—

Sister (acting Matron) Miss Ellen Tobin (206476), Queen Alexandra's Imperial Military Nursing Service.

Sister (acting Matron) Miss Beatrice Mary Webster (218267), Queen Alexandra's Imperial Military Nursing Service (Dodford, Northants).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

Royal Army Medical Corps.

Major (temp. Lt.-Col.) T. E. A. Carr, M.B. (40097).

Major (temp. Lt.-Col.) P. D. Johnson (40544).

Capt. (temp. Major) T. S. R. Fisher, M.B. (150036).

Capt. (temp. Major) A. D. Stoker, M.B. (84316).

Capt. A. G. H. Clay, M.B. (103681).

Sjt. J. S. Peters (7533301).

October 19.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in the Middle East :—

Commands and Staff :—

Maj.-Gen. Sir Percy S. Tomlinson, *K.B.E., C.B., D.S.O., F.R.C.P.* K.H.P. (5847), late R.A.M.C.

October 26.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

The Distinguished Service Order.

Capt. Vivian James Downie, *M.C., M.B.* (85900), Royal Army Medical Corps (London, S.W.1).

The Military Cross.

Capt. (temp. Major) Arthur Charles Slencer Hobson (106830), Royal Army Medical Corps (Penzance).

Capt. Leonard Crome (89901), Royal Army Medical Corps (London, N.W.3).

Capt. James Arnold Petrie, M.B. (250974), Royal Army Medical Corps (Arbroath).

Capt. Alexander Irvine Pirie, M.B. (167750), Royal Army Medical Corps (Neven, Fifeshire).

The Military Medal.

7354705 L/Sjt. David Thomas McKay, *M.M.,* Royal Army Medical Corps (Liverpool).

7359367 L/Sjt. Roderick Morrison, Royal Army Medical Corps (Conon Bridge, Ross-shire).

2023178 Cpl. Ivor Henry Humphries, Royal Army Medical Corps (Glamorgan).

7521337 Cpl. Albert Lloyd, Royal Army Medical Corps (Kidderminster).

738180 L/Cpl. Norman Richard Chapman, Royal Army Medical Corps (Bletchley, Bucks).

7392138 L/Cpl. John McKernan Logue, Royal Army Medical Corps (Bellshill, Lanark).

October 13.—Major W. R. D. Hamilton, *O.B.E., M.B.* (24782), to be Lt.-Col. Aug. 24, 1944, with seniority June 6, 1944, next above Lt.-Col. F. Holmes, *O.B.E., M.B.* (1589).

October 17.—Major (War Subs. Lt.-Col.) A. M. Simson, M.D. (15747) to be Lt.-Col. Oct. 4, 1944.

Lt.-Col. W. Millerick, *M.C.* (15786), having attained the age limit for retirement, is retained on the Active List superny., to establ., Oct. 18, 1944.

War Subs. Major I. U. Young, M.B. (64939), is restored to establ., Aug. 14, 1944.

Capt. S. J. Meyersohn (66470), M.B., to be Major, Sept. 27, 1944.

October 20.—Major (War Subs. Lt.-Col.) R. Murphy, M.B. (24226), to be Lt.-Col., Oct. 18, 1944.

October 24.—The undermentioned to be Majors :—

Oct. 24, 1944 : Capt. (War Subs. Major) W. N. J. Clarke, M.B. (66474).

Oct. 25, 1944 : Capt. (War Subs. Major) W. G. Greene (63804).

Capt. (War Subs. Major) I. U. Young, M.B. (64939).

Capt. A. J. A. Gray (63808).

Capt. (War Subs. Major) G. M. Denning (63801).

October 31.—Capt. (War Subs. Major) P. L. E. Wood, *M.B.E.* (65535), to be Major, Oct. 25, 1944.

Capt. H. H. Atkinson, M.B. (63767), to be Major, Oct. 30, 1944.

THE ARMY DENTAL CORPS.

October 31.—Major (temp. Lt.-Col.) W. Wormington (38803), having attained the age limit for retire-

ment, is retained on the Active List superny. to establ., Oct. 15, 1944.

DEATHS ON ACTIVE SERVICE.

WAINMAN, Capt. F. M. Killed in action, N.W. Europe.

WHITLEY, Capt. E. N. Died of wounds, N.W. Europe.

THOMPSON, Capt. W. R. Died abroad.

BERGIN, Capt. M. D. M. Killed in action, Italy.

SAUNDERS, Lt. A. H. Died of wounds.

BINNINGTON, Capt. P. Died of wounds.

DOYLE, Capt. J. T. Killed in action.

ELLIS, Major E. L. H. Died.

MISSING.

MAWSON, Capt. S. R. N.W. Europe. TOBIN, Capt. J. J. W. O'H. N.W. Europe.

DEATHS.

THOMAS.—On September 4, 1944, Major George Trevor Harley Thomas, R.A.M.C., Retired. Born in Pimlico, London, March 19, 1860, he took the L.S.A. in 1881, the M.R.C.S., England, in 1882, and the F.R.C.S. Edinburgh, in 1889. Commissioned Surgeon February 3, 1883, he was promoted Surgeon Major February 3, 1895, and retired as Major R.A.M.C. August 26, 1903. During the Great War he was re-employed from August 5, 1914, till January 31, 1918. He served in South Africa 1899-1902 taking part in the actions at Colesberg January 15, 1900, to February 12, 1900, and operations in the Orange

River Colony, being awarded the Queen's Medal with two Clasps and the King's Medal with two Clasps.

OFFICER.—Major John Moore Officer, R.A.M.C., who was taken prisoner at the fall of Hong Kong, is now presumed Killed in Action, October 1-2, 1942, whilst a prisoner of war in Japanese hands. Major Officer was born May 31, 1907, and took the M.B. Edinburgh, in 1930. Commissioned Lieutenant September 17, 1930; he was promoted Captain March 17, 1934, and Major September 17, 1940.

ROYAL ARMY MEDICAL CORPS AND ARMY DENTAL CORPS COMFORTS GUILD

We are publishing this month our Annual Balance Sheet, and Lady Hood and the Committee acknowledge with extreme gratitude the many marvellous donations that have come in to the Fund during the last year and which have enabled us to do so much for the R.A.M.C. prisoners of war and for the men serving overseas. We want also to express a special word of thanks to our friends who are

giving up so much of their time to knit for the men.

Mrs. Richmond, who has put in a lot during the last three years as Hon. Sec now left the country, and Mrs. Sandiford over the duties of Hon. Secretary and Mrs. has become the Hon. Treasurer.

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RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED JULY 31, 1944.

	£	s.	d.	£	s.	d.
To Cash at Bank and in hand at Aug. 1, 1943—						
At Bank—Glyn Mills & Co. . . .	1,187	0	3			
In hands of Hon- orary Officials . .	3	5	3½			
				1,190	5	6½

„ Receipts :—						
Donations and						
Subscriptions . .	8,127	5	8			

	£	s.	d.
By Comforts :—			
Wool	128	0	0
Books	150	0	0
Games	508	11	7
Other Comforts	423	2	6
	1,209	14	1
Prisoners of War Parcels and Comforts	1,662	5	1

„ Donation --			
Duke of Glou- cester's Red Cross and St. John Fund for Prisoners of War			
„ Office and Distri- bution Expenses—			
Taxi Fares and Travelling	4	8	6
Stamps and Stationery	17	9	10
Parcel Post	4	18	10½
Packing Ex- penses	23	0	6½
Cheque Books . . .	1	10	10
Sundry Ex- penses	3	16	7
Audit Fee	5	5	0

„ Cash at Bank and in hand at July 31, 1944—			
At Bank—Glyn Mills & Co. . . .	5,882	15	6
In hands of Hon- orary Officials . .	2	6	4½

9,317 11 2½

9,317 11 2½

We have prepared the above Receipts and Payments Account from the books, accounts and of the Guild and certify the same to be correct in accordance therewith.
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December, 1944.

No. 6.

Vol. LXXXIII.

Journal

OF

THE

Royal Army



Medical Corps

ISSUED

MONTHLY

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LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

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Bonney, V. and Sandeman Allen, H. (1944), *Brit. med. J.*, 2, 210.

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In almost every quarter of the globe where traces of ancient but now forgotten civilizations are unearthed is to be found the ring — in ancient Egypt, amongst the Etruscans, the Cretans and Mycenæans, in China and India, in the relics of the Aztecs of Mexico and amongst those of our Celtic ancestors.

And always the ring has been the symbol either of rank or authority or given as a pledge.

Probably the most ancient rings which have come down to us are the Egyptian and it is interesting to note that where rank or means did not allow of a golden ring less precious metals such as bronze, or even glass or pottery, were used.

In Roman times only ambassadors and senators, consuls and others of high estate were privileged to wear golden rings; the great majority of Romans wore plain iron rings. It was the Romans from whom we took our custom of giving a ring as a pledge — both the betrothal ring and the memorial ring, the latter being a pledge to keep the memory of the departed.

As early as the second century the Roman custom of pledging by the ring was adopted by the Church and we have the institution of the wedding ring which has ever since been an essential symbol of Christian marriage.

And through the ages the art of ring making has called for the exercise of the greatest skill on the part of the goldsmith craftsman. The modern solitaire diamond claw set in platinum may not compare in elaboration with the chased hoops of Benvenuto Cellini, but it expresses the same eternal symbolism.

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Death of Her Majesty The Queen's Father, the Earl of Strathmore and Kinghorne, K.G., K.T., G.C.V.O.

THE Director-General, Army Medical Services, who sent the telegram below to our Colonel-in-Chief, has received the following gracious message from Her Majesty The Queen.

The Director-General,
Army Medical Services,
War Office.

Please convey my heartfelt thanks to all ranks of the Royal Army Medical Corps for their message of sympathy in my great loss.

ELIZABETH, R.

The Private Secretary to Her Majesty The Queen,
Buckingham Palace.

Colonels Commandant and all ranks, Royal Army Medical Corps, submit their deepest sympathy to their Colonel-in-Chief in her bereavement.

The Director-General,
Army Medical Services.

LETTER FROM THE DIRECTOR-GENERAL
ARMY MEDICAL SERVICES

WAR OFFICE,
LONDON, S.W.1.

9th November, 1944.

MY DEAR WHITFIELD,

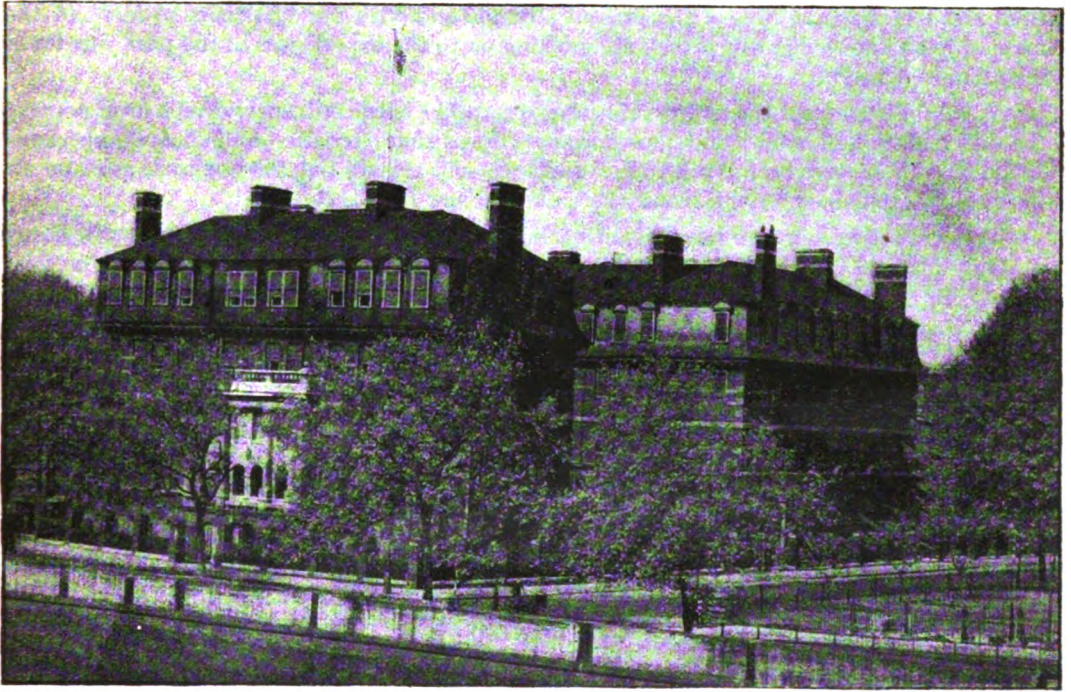
I should be grateful if you would publish the following in the Corps Journal.

Once more the season of peace and goodwill finds us in the throes of a world-wide war. This has been a memorable year, rich in the achievements of allied arms. The promise of a speedy victory has never been brighter. The Army Medical Services have played their part in these great deeds in every part of the world in a manner which has aroused universal gratitude and admiration. I know full well that these splendid results have only been possible by the unsurpassed team work of all ranks everywhere, and to everyone of you, The R.A.M.C., The Army Dental Corps, the Q.A.I.M.N.S., the T.A.N.S. and the V.A.D.s, congratulations and best wishes.

Yours sincerely,
ALEX. HOOD.

*Lieut.-Colonel C. A. Whitfield, M.B., R.A.M.C.,
Manager,
"Journal of the Royal Army Medical Corps,"
The War Office (A.M.D.2),
London, S.W.1.*

Christmas Greetings and New Year Wishes.



WE wish to take this opportunity of sending Christmas Greetings and New Year Wishes to all ranks of the Royal Army Medical Corps ; to all Nursing Officers ; to all ranks of The Army Dental Corps and to all Auxiliaries of the Medical Services. Many who are now serving Overseas may not receive these wishes until the Year is far advanced. We would assure them that they are not forgotten. We wish them all success in their endeavours and a safe return when the time comes.

We send the same greetings to all ranks of the Medical Services of The Royal Navy and The Royal Air Force whose steadfast and constant devotion to duty and whose ever willing collaboration have contributed so much to our common endeavour.

We also send greetings and good wishes to all members of the Medical Services of Dominion and Allied Armed Forces. Their constant harmonious co-operation has done much to solve many medical problems. The Medical History of this World War will show how great has been our unity and is an augury of continued unity of purpose in the years to come.

Our Corps was conceived in the " Blood, Sweat and Tears " of the Crimea ; developed in the dust, heat and reverses of South Africa ; matured in the First European War and has come to the fullness of growth and stature in the present World War. This development is due, in the main, to a succession of wise, far-seeing and capable Directors-General under whom served competent Administrative Officers.

Even with their direction and guidance little could have been achieved without the succession of devoted research and clinical workers at the Royal Army Medical College to whose devoted labours the present professional reputation of our Corps is so largely due. To them, as to the many workers in fields overseas, labouring quietly and conscientiously, our Corps

owes a great debt of gratitude. We hope that those who are still left to spend the quiet evening of their days after laying down the burden of an active professional life will know that their work has not been in vain and that they are still remembered. To them, at this time, we send our Greetings and Good Wishes.

No man can tell what the future may hold. What we can say is that, with Administrators tried and tested in the fires of the present struggle and with our clinicians so alive to that mass of fresh knowledge which they are grafting on to the experiences of the past, our future seems indeed bright.

As will be seen from the photograph, the Mess and College still survive as a focal point for the dissemination of good-fellowship—always a Corps characteristic—and clinical experience. To be sure, there have been " incidents " and scars will remain but the work has gone on and the Mess has remained a rendezvous where old and new friends can meet.

We feel that we can look forward with confidence to the future of the College as the Centre of Army Medical activities and anticipate further expansion and developments in the years ahead.

We take this opportunity of extending a welcome to all those young men now serving in our Corps. We wish them all success. To those who hesitate to make the Corps their career we would say, " Stay with us yet awhile for the Desert Places are ahead and we need the keen eyes of Youth."

Should this reach any who have the misfortune to be Prisoners of War we would assure them that they are not forgotten and it is the earnest wish of all that, before long, they will be back with us again.

Authors are alone responsible for the statements
made and the opinions expressed in their papers.

Journal of the Royal Army Medical Corps.

Original Communications.

"REGIMENTAL SALUTE."¹ ROYAL ARMY MEDICAL CORPS.

[Received May 23, 1944.]

ONE of the great problems of war is the rescue of soldiers who become sick or wounded and restoring them to full health so that they may take their place again in the fighting ranks. Although this work is attended with the greatest hazards of war too little is known about it. Yet some of the finest acts of gallantry and self-sacrifice have been performed by members of the R.A.M.C.

Up till the seventeenth century armies were quite temporary and were merely raised for a campaign and disbanded at its conclusion. The medical services of such forces were very inadequate, in fact, the only doctors they had were those privately attached to high officers.

Humane feelings were not particularly strong; life was held cheaply and the wounded, being regarded as useless as soldiers, were left to shift for themselves. It was often considered an act of mercy to kill one's wounded to put them out of their misery.

With the establishment of the Standing Army in 1661, medical matters began to improve. Doctors were appointed permanently to regiments and they wore the uniform of their regiments. There was a regimental hospital, staffed by members of the regiment. In fact the early medical service was entirely regimental. This system was in operation right up to the middle of the nineteenth century. In addition to the regimental medical officers there were, however, some who were appointed to military hospitals of a more general character.

But in those early days the nursing arrangements for troops serving overseas and on active service were most unsatisfactory. Trained female nurses, as we know them to-day, had not been thought of. Such nursing as the soldier got was performed by soldiers' wives, some of whom were officially permitted to accompany their regiments even on to the field of battle.

Medical supplies were usually very short and Army doctors were compelled to work under great hardships. Nevertheless, in battle, they exhibited a fine spirit braving all the hazards common to a soldier's life with a high sense of duty.

Their example had its effect upon the soldiers' wives who never hesitated to tear up their underclothes to make bandages when supplies had been exhausted, as was often the case.

¹ Broadcast May 15, 1944. Published by kind permission of the British Broadcasting Corporation.

And so, in those distant days, medical officers, undaunted by the most adverse conditions, displayed the greatest devotion to duty which has always been a main characteristic of the Corps.

The great campaign of the nineteenth century was the Peninsula War of 1808-14. This campaign was peculiarly difficult for medical officers largely owing to the shortage of essential materials and staff. But the nature of some phases of the campaign made the conditions much worse.

Sir John Moore's famous retreat to Corunna, in the winter of 1808-09, is a case in point. The retreat was carried out over mountainous country in perpetual rain and sleet. Transport of sick and wounded was impossible and those that could had to shift for themselves.

The Peninsula War, however, was mainly responsible for bringing to notice one of the greatest figures in the history of the Army Medical Services—Surgeon General Sir James McGrigor. He entered the Army in 1793 as a Regimental Medical Officer and saw much service in Flanders, the West Indies, India and Egypt. His unremitting attention to duty, coupled with great administrative ability, courage and self-reliance, brought him to the fore.

During the Peninsula campaign he became the Chief Medical Staff Officer to the Duke of Wellington whose confidence he soon gained. The Duke wrote of him—"He is one of the most industrious, able and successful public servants I have ever met."

Sir James was Director-General of the Army Medical Service from 1815-1851, and during that period he introduced many reforms and generally put the Service on its feet.

His name is perpetuated in "McGrigor Barracks," the home of the R.A.M.C. at Aldershot.

In spite of the efforts of ardent reformers, little progress had been made in the administration of the sick and wounded up to the middle of the nineteenth century. For the Crimean War a Hospital Conveyance Corps, composed of old, feeble pensioners, was hastily formed. It proved a failure and soon ceased to exist.

The Land Transport Corps then took over the duty of conveying the sick and wounded at the front. But this corps had many other functions to perform. Then came into existence the Medical Staff Corps whose whole interest was in their patients.

The inadequacy of the medical arrangements for our troops fighting in the Crimea were brought home sharply to the general public by Florence Nightingale. But no one was more conscious of the lack of facilities for medical treatment than the doctors themselves.

Under the extremely difficult conditions the medical officers carried out their duties with the greatest courage and three of them gained the much-coveted Victoria Cross.

After the war the Medical Service came under a searching examination, and as a result the "Army Hospital Corps" was formed in 1857, "For the better care of the sick and wounded soldiers." At first the Corps consisted of men only but later officers were appointed to it.

Sir Sidney Herbert had been Secretary of State for War during the Crimean War and he had taken a great interest in the development of the Army Medical Department. In 1861, the "Herbert Hospital" was opened at Woolwich, its name being a tribute to his work.

Gradually other hospitals were built in a number of stations and the Medical Service was being got on to the right lines. The self-sacrificing conduct of Medical Officers during the Indian Mutiny enhanced the prestige of the Department, due in part to the fact that five of them were awarded the Victoria Cross. Other doctors earned this highest of distinctions for service in New Zealand.

In active operations officers of the Army Medical Department and men of the Army Hospital Corps continued to perform acts of gallantry even under the very worst conditions. A typical instance was the action at Rorkes Drift in Natal, in 1879, when thousands of Zulus attacked our post of 100 men.

Here the building used as a hospital was set on fire yet Surgeon Major Reynolds worked untiringly and fearlessly in the open, exposed to the full fury of the enemy. In recognition of his outstanding courageous conduct he also was awarded the Victoria Cross.

In 1884, the title of the Army Hospital Corps was changed to the earlier name of "Medical Staff Corps," and the officers were formed into a "Medical Staff." Thus men and officers

were still kept apart and so it was until 1898 when they were joined together by fusing the Medical Staff and the Medical Staff Corps. The result of this re-organization was the Royal Army Medical Corps.

No expeditionary force, however great or small, can to-day take the field without its quota of personnel from the R.A.M.C. It does not matter whether the theatre of operations lies in the mountains of Afghanistan, the sands of Egypt, the swamps of Burma, or the close country of Europe, all present their own problems associated with the administration of the sick and wounded. But, quite undaunted by the most adverse conditions, officers and men of the Corps, inspired by a great devotion to duty, surmount all difficulties and solve all problems in the interests of those committed to their care.

Only two persons in the whole of the forces of the British Empire have won a bar to the Victoria Cross, and it is the proud distinction of the Royal Army Medical Corps that both belong to them. Colonel Martin-Leake was awarded the V.C. during the war in South Africa, 1899-1902, and gained his bar in November, 1914, during the last Great War. Captain Chavasse won his V.C. in 1916, and his bar a year later.

During the Great War numerous references to the outstanding achievements of the Corps will be found in the dispatches of the various Commanders-in-Chief, testifying to the noble work done by its personnel. Nearly 7,000 members gave their lives in the service of their country and over 6,000 received decorations, including seven Victoria Crosses, in recognition of individual acts of bravery in the face of the enemy.

In the present war the Corps has been able to bring into action the results of its vast accumulated experience. Wireless and mechanization have speeded up the pace of engagements but they are also employed in the administration of the sick and wounded. Casualties are reported by wireless and motor transport conveys doctors and orderlies to the place they have occurred as well as evacuating the wounded. Aircraft are also used for this purpose.

Among the new and up-to-date methods now in use are those connected with surgery and the dressing of wounds to prevent infection. New drugs, such as the now famous M & B and penicillin, and blood transfusion are administered.

The whole field organization of the R.A.M.C. has been so arranged as to ensure that the fighting man shall receive the benefit of these modern methods. By so doing the number who are absent from duty is reduced to a minimum during a minimum period.

In the face of the greatest difficulties created by nature and the enemy the Royal Army Medical Corps has carried on its great work in a noble spirit.

And now to all members of the Royal Army Medical Corps serving overseas we bring this message from the Representative Colonel Commandant of the R.A.M.C.—Major General J. W. West.

MESSAGE FROM MAJOR-GENERAL J. W. WEST, C.B., C.M.G., C.B.E.,
Representative Colonel Commandant, Royal Army Medical Corps.

As the representative Colonel Commandant of the Royal Army Medical Corps, I have been given the unique privilege of broadcasting a personal message to all ranks of the Corps serving in the various theatres of war overseas and in so doing I have been asked by the three other Colonels Commandant of our great Corps to associate them with this message.

To officers who have spent most of their active years in the Corps, who have loved it and worked for its well-being, the knowledge that during this war you have enhanced the great traditions of the Royal Army Medical Corps and lived up to its motto, "In Arduis Fidelis," is a matter of great pride.

Our Director-General who has recently visited you on the various fronts has given us an account of your splendid work, not only in tending the sick and wounded and rescuing them from the firing line, but also of the important work you have been doing in the prevention of disease without which no Army can remain efficient and enable the Commander to win battles.

We know of your gallant work in the fighting line and we regret that many of your comrades have lost their lives and others have had the misfortune to fall into enemy hands as prisoners of war. But in paying tribute to your gallantry we do not forget that The Royal Army Medical Corps has many highly trained technicians amongst its rank and file who are skilled nurses, laboratory attendants, both hygiene and pathological, radiographers, masseurs, operating room attendants, and special treatment orderlies. Your work in these capacities may not be as spectacular as front line work but is a great factor in saving lives and maintaining an efficient military force.

Time is too limited to say all that I would like to say but you are always in our thoughts ; we thank you for what you have accomplished and for what you are likely to be called on to do in the near future.

We wish for all your sakes a quick ending to the war and a happy return to your homes and those you love.

No Corps could do less than its best, having the great honour to have as our Colonel-in-Chief, Her Gracious Majesty The Queen.

SICILIAN INVASION.

BY MAJOR REX BINNING,

*Royal Army Medical Corps.**[Received October 27, 1944.]*

ON May 15, 1943, I joined a field surgical unit that was returning to the Nile Delta. The morale of everyone was high. The Tunisian campaign had just been brought to a highly successful conclusion.

After a year in the Desert we were all looking forward to leave and to dipping deeply into the flesh-pots of Egypt ; to sailing at Alex ; to almost peacetime meals at the Union Club and the Union Bar ; to lunch and swimming at Gezira ; to stately dinners on the roof of the Turf Club and to dancing at the Continental and in the garden at Shepherds. The men had similar ideas and having been unable to spend a penny for months they all had credit balances in their pay-books that would have commanded the respect of any bank manager.

Many units were returning at this time. Some went all the way by road. A most amazing journey was made by a driver and a serjeant who drove their Brigadier's car from Corps H.Q., just south of Enfidaville to Cairo, a distance of some 1,700 miles in three and a half days. The Brigadier was delighted to see them and his car so soon but his congratulations were somewhat modified when the car had to spend the next week in the R.E.M.E. workshops.

My own unit went by sea from Tripoli to Alex. We joined up with the first convoy for many months to come right through the Mediterranean from England. Certainly no time was lost in exploiting the command of the Mediterranean that was given us by our occupation of the coast of North Africa. Our only excitement on this trip was when a R.A.F. pilot baled out ahead of the convoy and was picked up by one of the escorting destroyers ; but, judging by the frequent changes of course we made, the Commodore of the convoy must have had reason to be much more worried than we were.

Most of the time our course took us close enough to the coast to see Derna, Tobruk, Bardia and Sollum, places that had been in the headlines for years and which were soon going to sink back into the obscurity from which they had been dragged by the war.

Our first dinner in Alex showed us that things were not what they were. Now that the enemy was hundreds of miles away Egypt was suffering a measure of austerity such as had never obtained when the enemy was at its gates. Rationing had been introduced and prices had soared but a spring bed and a hot bath were as pleasant as ever.

The next day we found our transport that had come by another ship and received orders to go to a camp at Geneifa on the Canal. We found the camp with the greatest difficulty and on arrival we were presented with a sack of official mail. Most of this on examination proved to be Area Routine Orders from Benghazi, Tripoli, Sousse and other sub-areas through which we had passed months previously and which had been following us ever since but from the rest there emerged the fact that an invasion was being planned somewhere, some time, and that we were going to participate in it. It was a rude awakening and with it vanished our dreams of a leisurely leave in Alex.

The broad outline of the plan soon became clear. We were to go ashore a few hours after the assault troops with a skeleton team carrying on our backs our own equipment and sufficient medical stores to operate for forty-eight hours until our three-ton truck was expected to arrive. The rest of the team were expected to arrive by hospital ship about this time, too, but it was not until six weeks later that our fifteen-hundredweight truck was due.

I suppose no Army in the history of the world has marched less than the Eighth Army in the Desert. Transport was the solution to every difficulty and sometimes when a camp

was well dispersed one took a car from the office to the Mess. We had become very truck minded and the idea of carrying equipment on our backs was another shock that we sustained at this time.

New equipment had to be drawn and our three-ton truck packed and waterproofed and got away to Alexandria for shipment within a few days. Its total weight had to be under five tons. We thought the weight of an empty three-ton truck to be about three tons and this would enable us to load nearly two tons of stores into it.

In order to make sure we telephoned the Brigade Major, the Brigade R.A.S.C. Officer and the Brigade R.E.M.E. Officer and they knew as much about the weight of an empty three-tonner as we did. Then some genius in the unit to which we were attached, possibly inspired by thoughts of an excuse for a pleasant luncheon in the French Club at Tewfik, decided to take a truck to the nearest weighbridge. He returned with the news that it weighed so many thousand kilogrammes. When the necessary calculation had been made this proved to be four tons and four hundredweight. This was a bombshell. Consternation spread throughout the camp. This meant that only sixteen hundredweight could be loaded into each three-tonner. How this difficulty was solved must remain a secret but it is enough to say that all the trucks were eventually landed without mishap.

Having got our three-tonner away we settled down to some serious training. Before the sun got too high we walked for miles with our own equipment and our assault packs, together totalling about sixty pounds. We went for runs over the sand hills around Geneifa and were soon very fit indeed.

After a fortnight the brigade to which we were attached was sent off on a full scale exercise in the Red Sea. I went on the advance party for this and I was surprised to find that it was the ship in which I had travelled from England to the M.E. over two years previously. The same ship, but a very different one. Landing craft had taken the place of the ship's lifeboats. The boat deck which had previously had a remarkable amount of deck space was now so crowded with gun platforms and mysterious-looking rocket apparatus that there was no room for a game of deck tennis. Cabins that had held one in peacetime and two on my first trip now had accommodation for six or eight. But the ship's officers were the same and I spent many pleasant hours with the ship's "Doc," the Engineers and the Purser.

When the rest of the Brigade was embarked we steamed down to the Gulf of Suez to Safaga Island. The plan was that we were to carry out a landing. The beaches had been prepared so as to resemble as near up as possible the beaches on which we were to land in the real invasion. There were wire and dummy mines and a defending force. Having overcome this opposition we were to go to a N.A.A.F.I. at which it was alleged there was even beer for the troops. In such a desolate place this seemed too good to be true and unfortunately we were never able to find out. In port it was dead calm and very hot but as soon as we neared Safaga Island a breeze sprang up and it became almost cool. To us landlubbers the sea did not look very rough but the Ship's Bo'sun said it was too rough for landing craft and, furthermore, that it was always like this here at this time of the year and that if we stayed a week we would never get ashore. This sounded like defeatist talk but was quite true.

The disembarkation of several thousand men with kit and stores from a large ship into assault craft within a few hours is not an easy problem to deal with. A large ship is, at first sight, a maze of decks, alleyways and companionways that vary with each deck and are not even the same on both sides of the ship. To the crew who have lived aboard the ship for months it is easy but the soldier had great difficulty in finding his way about to begin with. To add to the difficulties, the real invasion would take place in darkness and blackout precautions would have to be strictly observed. During these tedious days spent waiting for the weather to moderate sufficiently to permit a landing we rehearsed time and again the drill of getting units in the right order from their mess decks to the assembly points and from there to the sally ports until everyone could almost find their way about the ship blindfold. The voice of S.N.O. as he gave his directions over the loud speakers became

more and more plaintive, but the result was that in the real invasion the disembarkation went without a hitch.

The Higher Command were naturally loath to call off an exercise for which such careful preparations had been made but after waiting five days it was clear that the bo'sun had been right. It was decided to attempt the landing in a more sheltered bay some forty miles to the North. The ships weighed anchor and steamed away. As we left we spared a thought for the unfortunate men ashore who had gone to great trouble to prepare for our landing.¹ While we were comparatively comfortable they must have been sweltering in the heat of that desolate and barren coast.

A short stay at the new bay was sufficient to convince everyone that this place was no better than the last. We therefore went to the head of the Gulf of Akaba where conditions were certain to be suitable. As we steamed up this lonely gulf we got an idea of the immense scale of this operation for which we were rehearsing. Coming towards us was ship after ship bearing names that were well known before the war. They had carried out an exercise with two divisions and were now returning to port. For a few days the village of Akaba, which in normal times is visited only by dhows, had enjoyed the distinction of being the premier passenger port in the world.

As soon as the anchor was down the captain called for his motor boat and took a party ashore for a swim. We were longing for a swim. We were enjoying this a lot until a member of the Palestine Police Force came and warned us of the presence of sharks in these waters.

Meanwhile the Higher Command was doing some very quick thinking. They caused the beach defences to be repaired; plans for this new landing were made and maps distributed to all unit commanders so that all was ready for a landing in the small hours of the next morning.

The assault troops were sent off at 03.00 hours and about an hour later we saw tremendous flashes as the sappers blew gaps in the wire with Bangalore torpedoes. Shortly after this we saw Verey lights that indicated that first Red beach and later Green beach had been taken. While we were waiting our turn to go ashore S.N.O. kept us informed of the progress of the operation over the ship's loud-speaker system. It was light by the time we went ashore. The Sappers had cleared a safe lane through the mine field and marked it with tapes, the Military Police had notices everywhere marking ammunition dumps, vehicle assembly areas and dewaterproofing areas.

We contacted the colonel of the field ambulance with whom we were going to work and we were about to set up a dummy medical unit on what was thought to be the place corresponding to the map reference when the other half of the field ambulance who had come by another ship were seen to be settling down a mile away. We walked over to join them and having argued for a while as to who was in the right place we eventually compromised by meeting half-way. No sooner had we disposed the unit in the new place than an umpire came up to say that this place was still considered to be under rifle fire and that we were all dead. He also said that we had come ashore on a beach that had never been taken anyway. It all seemed very difficult but our colonel soon talked him round and we could consider ourselves alive again.

It had become really hot by now and no one was sorry when the time limit for the exercise expired. We made our way back to the beaches but before re-embarking I visited Green beach which was to be the main supply route. One began to appreciate how thoroughly this organization for combined operations had been worked out at the Combined Training Centre.

Back on board ship after a bath, a change of clothes and a late luncheon, we decided that this was really warfare in comfort. Everyone was glad after so many disappointments and changes of plan that we had made a landing at last and the Higher Command seemed pleased with the way things had gone.

¹ Why? They still had the N.A.A.F.I. and the beer!—Ed.

We returned to port and disembarked. It might be thought impossible to keep the movements of such a large convoy a secret but a large measure of security was obtained. While we were waiting on the dockside for a train to take us to our camp an officer in a unit guarding the port came up to a group of officers and, thinking that they were just out from home, began asking the questions that new arrivals were always asked about England. What was the food shortage like? Were people getting enough to eat? How bad was the bombing and so on. As most of these officers had not been home for over five years their feelings at being mistaken for "new boys" can well be imagined.

We returned to camp and events moved to a climax. First the Corps Commander came and spoke to all officers in the Brigade. He gave a brilliant analysis of the exercise as he saw it from his position ashore and he emphasized the lessons we had learnt. Then we were inspected by the Army Commander and we learnt with satisfaction that we were still to be called the Eighth Army. He spoke under very trying acoustic conditions to over a thousand officers for an hour and a half. He analysed the psychology of the German and the Italian soldier and explained his technique of battle. Finally, about a week before we left, our Brigadier spoke to all officers in the Brigade down to the level of company commanders and disclosed the fact that we were going to invade Sicily. He described first the Army plan and then the details of the Brigade plan. Scale models of the beach and aerial photographs were studied. The Intelligence Officer told us what he knew of the dispositions of the enemy and details of water supply.

During the ensuing week we had further opportunities of studying the models, maps and photographs in a hut that was set aside for the purpose and suitably guarded. In the end I knew the beach on which we were to land and the surrounding country as well as I know my home town. We formulated our own plan. We were due to land about four hours after the assault troops and join up with the light section of a C.C.S. that was on another ship and set up a surgical centre in a certain wine cellar a quarter of a mile from the beach. A wine cellar seemed to offer certain advantages over other places.

The final week passed quickly and as we re-embarked in the same ship as we were in for the exercise everyone felt quite at home.

Our convoy of large ships passed through the Canal in daylight. We felt very conspicuous. Ships of this size had not passed northbound through the Canal for many months. One could not help reflecting that if the enemy could sink a ship of our size in the Canal it would be worth the loss to them of many bombers. Evidently the Higher Command thought so too as it was clear that the A.A. defences of the area had been considerably reinforced. The convoy lay in Port Said for a few days. On one day we all went ashore for a route march and a swim. This seemed to be tantamount to putting a telephone call through to the German Embassy at Ankara to tell them that we were coming. However I suppose the Higher Command realized that it was impossible to conceal the fact that the invasion was imminent and thought the risk justifiable. Certainly subsequent events proved them to be right. The secret of our destination had been well kept. Even the ship's officers, who always get to know most things, were betting on Greece being the objective right up to the time that the secret was out. As soon as the ship had cleared the harbour entrance the Captain broadcast our destination and read a message from the Admiral of the Fleet. Maps were distributed, copies of a booklet on Sicily given to each man and a timetable drawn up so that every officer could demonstrate the scale models of beaches and the maps and aerial photographs to his men. The keenness of everyone was very impressive. We were with a Brigade which had taken part in the defence of Malta. Nearly all the men had served over five years abroad and could have claimed to go home but they felt that first they had many old scores to settle with the enemy after those years when they had had to take it in Malta. The story of how well they fought and how effectively they settled their account with the enemy has so far been only partly told.

With so much to do the time passed quickly as we steamed past the now familiar coast of North Africa. Every day we expected to get warning of an impending attack from the

air but it never materialized. Doubtless the raid that the Commandos made on the airfields in Crete at this time contributed to our immunity. The Commander of the flotilla of landing craft in our Brigade gave us a lecture on some combined operations he had known. He concluded by describing the perfect combined operations at Vaasgo. In another lecture he reassured us considerably by describing in detail the precautions that were to be taken in this particular operation to see that we got put down on the right beach and by the time he had finished we felt that things could not possibly go wrong.

So far our trip had been like a peacetime cruise. We were reminded sharply that the war was still on when a signal was received from the Commodore of the convoy of ships carrying the motor transport which had left some days ahead of us. It stated that one of the ships had been torpedoed, fortunately with little loss of life. The various unit commanders held a hurried consultation to find out who had transport in this particular ship. For the next day one went round sympathizing with those who had lost trucks in this ship and thanking one's luck that it was not one's own. So well had the distribution between the various ships been made that no unit's efficiency was gravely affected. One officer came in for particular sympathy as his valise containing a precious bottle of whisky was lost in this ship.

The assault troops were due to land at 02.45 hours on July 10. On the morning of the day before we caught up the convoy of transport ships. Then a convoy of L.S.s.T. appeared and later a number of L.C.I.L.s attached themselves to our convoy. There were ships everywhere. Most impressive of the lot was the six-inch cruiser which was making a broad zigzag astern of us. Until now the weather conditions had been ideal but the wind got up and also the sea and it seemed to be getting worse. It was all right for us in a ship of 20,000 tons but we felt thankful we were not in one of the L.C.I.L.s that were trying manfully to keep up with us.

Just before the sun went down we got a wonderful view of Mount Etna fifty miles to the north. It seemed certain that the enemy would have O.P.s there who would give warning of our approach. It was not until we climbed Mount Etna a few weeks later that we realized that even a convoy the size of ours was invisible at that distance. Shortly afterwards the ships of our Brigade left the rest of the convoy and made for the release position. We arrived there about midnight and the weather showed no signs of abating. The sea was still far worse than that which had caused the exercise at Safaga Island to be put off. The Colonel gave a last word of encouragement to his battalion over the ship's loud speakers and they took their places in the assault craft about 01.00 hours. They would all be soaked to the skin before they landed. One wondered how many of them would be fit to fight by the time they got ashore but apparently when the time came everyone was so keen to get on to dry land that they would have overcome the strongest opposition.

After the assault troops had gone off there was a period of suspense. There was a fire burning away to the north-west which we assumed to be the result of a raid on Syracuse but there was nothing else to see and some tried to get to sleep. It was not easy as everyone was keyed up and excited. At last S.N.O. broadcast that he had received a signal to say that Red and Green beaches were now in our hands and the ferry service started. L.C.I.L.s came alongside with difficulty and embarked troops. One man had a lucky escape. He fell between the ship and the landing craft with his fifty rounds of ammunition, entrenching tool and several hand grenades all strapped to him. Luckily his Mae West was inflated and to everyone's surprise he stayed afloat and was pulled out by the bo'sun none the worse save for the loss of his rifle.

As it got light the wind dropped and the sea quickly subsided. The beaches were still under shell fire and occasional splashes were seen as shells fell among the craft that were unloading. One had been hit and was burning. Close inshore was a Dutch sloop which fired a broadside every time the guns of the shore batteries fired. Further out to sea was a monitor doing the same thing while our six-inch cruiser ploughed to and fro looking for a target worthy of her strength. Soon the guns on shore were silenced and the ships of our

Brigade moved close inshore. We could now see the details of the place clearly and we were struck by the fact that it looked exactly like the scale models.

All this time we were expecting to see the Luftwaffe. The D.E.M.S. (defensively-equipped merchant ships) gun crews were closed up and very keen to show what they could do if given a chance. Aircraft were spotted overhead and they were very disappointed when they proved to be British. The Luftwaffe seemed to have been caught on the wrong foot that first and vital day.

The move inshore had enabled the ferry service to be speeded up and our turn to go ashore soon came. Just before we left the ship we were greatly heartened by seeing a L.S.T. creep right inshore, open its doors, drop its ramp and land its Sherman tanks in a few minutes. This was the first time we had seen anything like this and it was clear from that moment that these craft, designed in Britain and built in the United States, were going to be the big success in the invasion.

We went ashore in an L.C.A. and had time to thank the tired but cheerful Second Lieutenant R.N., who was in charge, for getting us ashore without wetting our feet, and set off to the wine cellar along a path which seemed strangely familiar. This cellar, unfortunately, contained no wine but many fleas. However it proved a very good and a very safe dressing station until we were able to move inland and occupy a school forty-eight hours later.

There was work to be done as soon as we arrived and it says much for the organization that supplies of blood were available for the wounded right from the beginning. We worked steadily for the first twelve hours but during a break I found time to visit the beaches. Everything was going according to plan. The big ships had already unloaded and had left. The M.T. ships were unloading steadily and the combined Naval and Military team on the beaches were directing things smoothly. Already there was quite a formidable balloon barrage over the beach and A.A. guns were in place. Bulldozers had improved the unloading facilities and a wire track had been laid down.

In the evening a wave of enemy bombers came over but the barrage that they met must have surprised them. A few bombs were dropped but no damage was done.

The next day news filtered through from the other beaches. Everywhere things had gone well though on the American beaches it was touch and go for a little time. It was clear that the enemy had been completely deceived. He had expected us to land at the western end of the island and had made dispositions accordingly. The result was that when our troops landed on the south-eastern corner they had a very valuable forty-eight hours to consolidate before meeting the main force of the enemy.

On the second day the rest of our team who had come by hospital ship joined us and our transport came ashore. We went into a nearby village to reconnoitre more suitable premises. While we were there a driver came up and inquired the way to the Monte Highway. We felt that the conquest of Sicily had really begun. We were surprised to see that the Sappers had already got a train working. Everything had gone better than the most sanguine of us had dared hope and there was an Allied Army fighting in Europe for the first time since the fall of France.

AN ANALYSIS OF 800 CONSECUTIVE KNEE CASES.

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CERTAIN Army surgeons have unusual opportunities to study disorders of the knee. Since the war began one has treated well over 1,000 men with diseases or injuries of this joint and 800 consecutive cases in this series have been analysed, a number sufficiently large to provide data of some value regarding the age-groups between 20–40.

<i>Types of Lesions</i>	<i>Number of cases</i>
War wounds penetrating the knee-joint	88
Non-penetrating war wounds with sympathetic synovitis	44
Injuries of internal semilunar fibrocartilage	176
Injuries of external semilunar fibrocartilage	40
Cysts of semilunar fibrocartilages	23
Discoid fibrocartilages	2
*Acute traumatic synovitis	79
Chronic synovitis (non-specific)	15
*Sympathetic synovitis	36
Hypertrophic synovitis	7
Syphilitic synovitis	2
Tuberculous synovitis	1
*Hæmarthrosis	18
*Penetrating wounds of the knee (non-battle)	20
Strains of internal lateral ligament	41
Strains of external lateral ligament	9
Cruciate ligament tears (including those with associated fractures of tibial spines)	7
Osteochondritis dissecans	10
*Loose bodies due to other causes	8
*Fractures of femoral condyles involving joint	3
*Fractures of tibial condyles involving joint	9
*Fractures of patella	13
*Dislocation of knee	1
Fracture-dislocation of knee	2
Dislocation of patella	4
Recurrent dislocation of patella	2
*Suppurative arthritis	8
Osteoarthritis	47
Rheumatoid arthritis	7
Synovial cysts	7
*Fibrous adhesions	9
*Instability of knee due to muscle weakness (old poliomyelitis, 2; old wounds of thigh, 3; cause undiagnosed, 1)	6
Acute prepatellar bursitis	11
Chronic prepatellar bursitis	10
*Miscellaneous conditions	35
Total	800

*Excluding all cases due to war wounds.

There are certain features which merit comment. The most unusual feature is the high proportion of penetrating wounds. There were 108 such cases, 13·5 per cent of the total, but over four-fifths of these were battle casualties. Another 44 patients had battle wounds in the region of the knee which were non-penetrating or only doubtfully so but which had produced a variable degree of sympathetic synovitis. In a proportion of these cases considerable stiffness of the joints developed as a sequela of the wounds, due to peri-articular rather than intra-articular adhesions and, in a few, persistent œdema of the leg and foot was troublesome,

doubtless the result of injury or inflammation of many venous and lymphatic channels. Battle casualties, therefore, were responsible for 132 of the cases (16·5 per cent) and they form such a large and important group that they are being considered in a separate communication.

Lesions of the semilunar fibrocartilages accounted for 241 cases in the series (30 per cent of the total) and constituted much the commonest cause of internal derangement. If war injuries were excluded their importance would become even more apparent and there is also the possibility that certain cases were not diagnosed and were classified wrongly as synovitis. A definite history of injury was seldom obtained from those with cystic cartilages but, in the others, a history of one or more injuries was always given. An analysis of these causal injuries revealed that 67 per cent were sustained while playing football and a further 16 per cent were caused by other sports such as tennis, cricket, boxing, or indulging in such frolics as leapfrog during physical training. The remainder were incurred during more purely military duties such as assault and battle courses. In the Army, however, the term "on duty" has a wide significance, all organized games and sports being placed in this category, and any soldier disabled as a result of an accident on duty is entitled to compensation or a pension. Cantlie has estimated that in peacetime one soldier is invalided out of the Army every week on account of a knee disability resulting from a sports injury. How much greater these losses must be in time of war, with the vastly increased numbers of men involved, only the statisticians at the War Office could discover but the figures might be startling. Further information about the types and positions of the cartilage lesions is given in a subsequent communication.

The various forms of synovitis accounted for 202 cases (25 per cent), but again this figure is exaggerated by the presence of 44 cases of sympathetic synovitis due to war wounds. Leaving them out the percentage falls to just under 20.

Without the acid test of actual figures one would have expected a higher figure for cases of traumatic synovitis yet the proportion would have been still lower had not a number of doubtful cartilage and hæmarthrosis cases been included under this heading. It is uncertain if the figure gives an accurate impression of the incidence of this condition in the Army. Many men with a mild synovitis do not report sick or, if they do, most medical officers do not send them to hospital so that only the more severe and intractable cases reach the specialist. This is the most likely explanation of the relative dearth of such conditions in orthopaedic out-patient departments.

The other forms of synovitis formed a group containing examples of all the subacute and chronic varieties. The synovial membrane of any joint is a sensitive structure, weeping not only on account of traumatic or bacterial insults to itself but also in sympathy with the afflictions of its neighbouring tissues. The great extent and relatively superficial position of the membrane in the knee render it unusually liable to such mishaps. That is why examples of sympathetic synovitis were so common and, if all those due to war injuries were included, it would rank in this series as one of the most common affections of the knee. But that would give a distorted view for wounds due to explosives are very rare in the ordinary run of cases and it was to avoid such false impressions that war injuries were tabulated together, irrespective of the type of lesion produced.

Some knees appear to be more sensitive to injury than others and readily develop repeated synovial effusions on minor provocations, in contrast to most others where the synovial membrane becomes inured to recurrent traumata. This explained a few chronic and recurrent cases but the majority were the result of defective treatment of an acute synovitis and they were distinguishable from each other only by the fact that in the former the distention was persistent while in the latter the knee was apparently normal between attacks. Other possible causes such as syphilis, tuberculosis, osteochondritis, etc., were excluded by the usual methods.

The syphilitic cases had bilateral synovitis, with no stigmata of congenital lues, and both gave a history of exposure to infection within the previous year. The hypertrophic cases had

typical thickening on either side of the ligamentum patellæ and in the only case operated upon there was a suggestion of lipoma arborescens. Although only one tuberculous case is listed there were two other suspicious cases. A definite diagnosis, however, was not established so they were included in the chronic, non-specific group.

There were 57 examples of strains or tears of the various ligaments, 7 per cent of the total series. Lateral ligament strains or tears were diagnosed in 50 cases (6 per cent) although in several there was an element of doubt, particularly in those with pain and tenderness over the centre of the internal ligament. This sometimes indicates avulsion of the ligament from the meniscus—a combined ligament and cartilage injury. The lesions were produced by the knee being forced into exaggerated valgus or varus positions, internal strains being about five times as common as external, a fact explained by the normal inclination of the articulating bones. The great majority were incomplete so that undue mobility was not pronounced. Sports injuries again produced the majority of these lesions, accounting for 72 per cent of the total. On the other hand only one of the cruciate ligament tears was caused in this way. The other six were due to heavy or awkward falls, usually into trenches or pits during air raids or artillery bombardments. Analysis of the case histories supported the common view that the upper end of the internal and the lower end of the external ligament are most liable to suffer damage and that cruciate tears are usually associated with internal lateral ligament lesions.

Osteoarthritis provided the only other considerable group in this series—47 cases (6 per cent)—and, as this diagnosis was not made in the absence of definite radiological changes, several early cases must obviously have been excluded.

Reference to the table shows that none of the other conditions constituted a large group and none presented special features not described in standard works so space need not be occupied in discussing them. Whatever mode of classification is adopted a number of cases remain which refuse to be fitted easily into any group and they have therefore been described as miscellaneous, an unsatisfactory designation for a group containing some of the most interesting individual cases. By using elaborate systems they could all be included, for it is possible to go on rearranging almost *ad infinitum*, but an end must be made somewhere as space and time are finite in medical if not in mathematical affairs.

My thanks are due to Brigadier P. Wiles, Colonel H. D. F. Brand, and Colonel L. A. J. Graham for permission to forward this article.

REFERENCE.

CANTLIE, N., *Journ. R.A.M.C.*, 1940, **75**, 69-77, 141-151.

DESERT SORE.

BY CAPTAIN D. MACRAE, M.B., Ch.B.,

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[Received April 5, 1944.]

GENERAL.

WHILST R.M.O. to an Infantry Battalion which travelled from Suez to Tunis from July 21, 1942, to early May, 1943, and then returned to the Desert, one was able to observe a large number of Desert Sores.

In the War, 1914-18, a similar sore was observed in Gallipoli (Trench Sore of Gallipoli) ; cases were also seen in Egypt, Palestine, Salonika and Mesopotamia.

A similar condition has been observed in South Africa (Veldt Sore), in North Australia (Barcoo Rot) and other parts of the world where hot dry sandy conditions prevail.

The same type of sore was personally seen in this Campaign, in Sicily, but of much lower incidence and again in Italy, both in troops who had served in the Desert and in troops fresh from England.

CLINICAL FEATURES.

A casual visit to an M.I. Room in the Desert would reveal the majority of cases attending as I.A.T.s of one day to three or four months' duration. The appearance varied, depending on the degree of chronicity, rendering a diagnosis of desert sore impossible except in the early lesions. Maintenance of transport and arms was a fruitful source of small cuts, the vast majority of which showed sepsis of varying degrees. Excluding these, one found that, as soon as soldiers learned, or were taught, the importance of obtaining early treatment for all cuts and other septic lesions, enabling one to see sores soon after their onset, there was a definite clinical entity which could be identified with the desert sore as described by Manson-Bahr in "Prevalent Diseases of Libya."

The earliest lesion was a thin-walled intra-epidermal bulla, painful, round or oval in shape, about one-eighth inch in diameter, centred on a hair, filled with thin sero-sanguinous fluid giving it a reddish brown coloration, and invariably surrounded by a narrow erythematous areola, the outer border of which is clearly defined indicating the extent of peripheral spread.

The onset is rapid, the patient often complaining that the night before there was no lesion. This initially made one feel that it was the result of the nocturnal attention of insects. The bulla rapidly increases centrifugally, some attaining a diameter of one inch, but there is no œdema of skin.

A characteristic feature is the dimpling of the bulla at the point of exit of the hair, especially marked in the latter stages before spontaneous rupture. The hair is cuffed with a thickened layer of epithelium which extends as a pillar to the base of the ulcer. Excision of the part produces pain and some capillary oozing. Peripheral spread leads to the inclusion of a number of hairs in most cases.

Even while spreading spontaneous rupture takes place exposing a shallow shelving ulcer, with dirty grey sloughing base, surrounded by an undermined fringe of epidermis. A similar fringe may be found round the hair. The hair is sited in the deepest part of the ulcer which is but slightly under the level of the surrounding skin and sometimes shed within four to five days. By this time the fringe of epidermis is also shed and the sore drying up with the formation of a dirty yellow crust. Untreated, it passes into a chronic stage lasting two to three months or more, covered with yellowish adherent crust "stuck-on" in appearance. Removal causes bleeding and presents the appearance of semi-epithelialized exuberant granulations. Treated at an early stage the majority rapidly heal in from six to fourteen

days, though one sometimes sees on the second day a lesion double in size and on the third day responding.

When it heals an area of thin erythematous skin is left, later violaceous and glossy and often devoid of hairs.

The majority are multiple, at different stages, and are recurrent though not on site of former sores. Lymphangitis and adenitis was a frequent complication especially in the early untreated sore (six to ten days).

The commonest site for these sores is the dorsum of the hands, especially the ulnar aspect which is most hairy, and then on the dorsal aspect of the proximal phalanges which also is hairy. I have never seen the lesion on the knuckles which is the commonest site for septic cuts amongst mechanized troops. Other sites are the dorsal aspect of the fore arm, back and neck, knees and upper third of legs. None was seen on face or on areas covered by clothing.

ÆTIOLOGY.

During this period of one year the general health of the battalion was better than in England, but there was a marked increase in the incidence of (a) tonsillitis; (b) impetiginous lesions of the face; (c) paronychia; (d) I.A.T.s; (e) otitis externa, plus the advent of (i) desert sore, (ii) prickly heat (miliaria rubra).

Only the occasional desert sore had to be evacuated and that in the presence of adenopathy. In fact the man-day loss to a regiment is much less than from I.A.T.s and tonsillitis. Incidence of desert sore is not higher than 5 per cent of all troops.

The desert sore appeared to be peculiar to a definite type of individual: blue-eyed, fair-haired, fair skinned, with little skin pigmentation and no tanning from sunlight, exposed hairs becoming bleached and brittle. The same type showed a greater proneness to develop impetiginous encrusted lesions of the face, often concurrently to sores or I.A.T.s but quite different in appearance, starting as an occasional papillo-vesicle, follicular at times, itchy, and rupturing to exude a straw-coloured serous drop which crusted over. These lesions were about 2 mm. in diameter, bilateral but asymmetrical, with a predilection for the corners of the mouth and angle of the ear where they showed tendency to fissuring and chronicity.

Tonsillitis was a very frequent concursor, practically always follicular and acute. The majority gave a previous history of sore throat.

Paronychia was seldom seen at home in troops but in the Desert it was of frequent occurrence. The initial lesion often resembled the desert sore: a purulent blister in the epidermis of the nail-fold, close to the base of the nail, spreading centrifugally and along the periphery of the nail undermining the epidermis and the angle or the whole base of the nail. The blister contains sero-sanguinous fluid. Excision of blister and undermined portion of nail with local application of antiseptic led to rapid recovery.

Otitis externa was of frequent occurrence but not related to tonsillitis. Most gave a history of previous ear trouble and suffered from I.A.T.s, sores and impetiginous lesions.

This increased incidence of septic epithelial lesions led one to feel that there was at least some common ætiological factor apart from the bacteriological which is not altered from that at home: staphylococcus and streptococcus. The response to sulphanilamide in all cases treated pointed to the virulent or complicating organism being streptococcal. Activity on the part of the skin saprophytes was seen in the incidence of miliaria rubra and bromidrosis, neither of which showed any relationship to desert sore. It would appear that there is an increased susceptibility of the epithelium, in particular exposed epithelium, to infection or else the occurrence in the Desert of a virulent specific organism.

In the summer months of 1942 the entire incidence was high, gradually diminishing until by December, excepting I.A.T.s, it was at a very low level where it remained until early May, 1943, when a sharp rise set in. This would indicate a climatic component as the important contributory factor, there being little change in the living conditions and habits of the troops. The hot months brought (a) heat and strong sun; (b) flying sand; (c) lighter and more abbreviated clothing with increased area of exposed skin; and (d) flies.

Heat and Sunlight.—Henderson (*Brit. Med. Jour.*, June 10, 1943) laid stress on sunlight as the ætiological factor. There does not appear to be a response to peculiar properties of sun's rays. In the outward voyage lasting from seven to eight weeks the only deleterious effects of sunlight noticed were erythema and mild burns of face, especially nose and forehead, arms and shoulders; nor is this the distribution of desert sores. The earliest sore was seen after four to six weeks in the Desert giving a total exposure to sunlight of at least twelve weeks. Desert sores were seen in Sicily in troops fresh from England within four to six weeks of their arrival. This however does not exclude sunlight as a contributory factor. Again in East Africa (Mem. on Trop. Dis.) where the sun is equally strong there is no incidence of desert sore, but here the humidity is high and there is no driving sand.

The dry heat of the Desert causes a dryness of the skin most marked in the fair, where the protective tanning response is absent, this being replaced by an erythema and later a hyperkeratotic reaction and occasional scaliness.

This at times leads to cracking and secondary streptococcal infection where a patch of skin, most common over nose or ear, of one-half to one inch in diameter, becomes undermined by a thin layer of pus and complicated by adenitis. Minor cracks usually occur elsewhere forming a portal of entry for intra-epidermal inoculation as possibly occurs in a desert sore, though here, from the frequency of its follicular appearance the portal maybe the follicle which is a weak link in the epidermal protective layer of a partially devitalized skin. The dryness is not so much of sweat—in fact one often experiences difficulty in making an occlusive Elastoplast dressing fix to the skin sodden with sweat—but is due to loss of essential fats at an irreplaceable rate.

Sand.—De-epithelialization from minor injury resulting in abrasions is facilitated and the hot stinging sand, partly by oft-repeated impact and partly from its admixture with sweat to form a fine abrasive, is an ideal irritant.

Abrasions.—While facilitating the entry of organisms do not lead *per se* to the formation of desert sores. In the winter months following an outbreak of pediculosis vestimentorum one saw numerous abrasions and scratches of arms and trunk, some showing a degree of secondary infection and impetiginization, but none approximated to the desert sore; yet the exposed hairy parts most subject to sun and sand are those where the desert sore appears.

One did not expect to find a high incidence of tonsillitis in the Desert. Having been surprised to find it high in summer one feared it should be higher in winter. This was not the case. The incidence was much lower. In hot weather the hot sand-laden air impinging against the fauces and tonsils, the latter often with a heritage from previous attacks of a predisposition to infection, could cause sufficient trauma to facilitate the proliferation of organisms. Bronchitis was very rare but the respiratory protective mechanism is suited to combat these factors.

Flies.—Coincident with the onset of the hot season is a colossal increase in the fly population—but they are always with us. Undoubtedly they play an important part in the cross spread of infection, the undressed sore being, second only to human faeces, their happy hunting ground. One cannot give them the role of intradermal inoculator. The biting variety was actually seen in Tunisia in March and April when the incidence of sores was lower. They were able to bite through Aertex shirts and stockings. No sores appeared on these covered areas.

Mosquitoes have been incriminated in some localities but there was none in the Desert while, in Sicily and Italy, the reaction in those who showed any was a papulo-vesicular eruption, very itchy, with scratch lesions but no bullous formation or other resemblance to desert sore.

Cleanliness.—One invariably found that following periods of close engagement with the enemy the number attending for treatment for sores was higher. That may be accounted for by (a) diminished water supply; (b) lack of cleanliness; (c) increased exposure to sun and wind; (d) delay in treatment of early abrasion and cuts; and (e) from hesitation to report sick at these times with what they considered trivial complaints. The actual influence of clean-

liness on the causation of desert sore is difficult to assess. Amongst those who found the greatest difficulty in maintaining a normal standard of skin cleanliness, chiefly those responsible for mechanical maintenance and operation, the incidence of I.A.T.s was very high, but there was no appreciable alteration in the frequency of the desert sore. The degree of sepsis amongst them was high and resolution retarded, sores often passing into the chronic stage. Ample bathing facilities, such as were available at Homs, did not influence the incidence of desert sore but resolution was much speedier.

In the presence of water shortage only face, neck and hands, fore-arms and knees are washed. This might raise the question whether daily washing with a small quantity of very soapy water—the soap often being highly alkaline—which soon became very dirty and sand laden is detrimental rather than beneficial when (a) it removes skin fats unless these are replaced artificially and they seldom are; (b) the sand acts as an abrasive; (c) the water rapidly evaporates, drying the skin and leaving a fine deposit of soapy debris to clog up the follicles.

Avitaminosis.—Vitamin C deficiency has been blamed as a causal factor: Rapport (*Brit. Med. Journ.*, ii, 96) mentioned the successful treatment of desert sore with ascorbic acid. This has certainly not been my experience. The ration scale did not indicate vitamin C deficiency and, from the later part of 1942, was supplemented by daily maintenance doses of ascorbic acid without any apparent effect. I have supplemented this in cases of desert sore but without any appreciable improvement attributable to vitamin C intake. In addition amidst the fruit of Sicily desert sore was observed. Major P. D. Stewart in an unpublished report indicates the frequency of an identical sore in Palestine where there was a more than ample supply of oranges. Major Bates considered vitamin A as a causal factor, but one is unable to substantiate its deficiency.

BACTERIOLOGY.

Manson-Bahr ascribed to the *C. diphtheriae* the causation of a high percentage of desert sores and noted the occurrence of neuritis. One saw, however, but two cases of faucial diphtheria and no case of peripheral neuritis. While diphtheroids might have been present the absence of neuritis would indicate non-virulent strains. It is of interest that A. H. Gray (Price's "Textbook of Medicine") recovered a pure culture of Klebs-Löffler bacillus from a paronychia.

Major Battley (*Journ. R.A.M.C.*, 1943) made cultures from 15 cases all of which had desert sores and impetigo. *Staphylococcus aureus* and *Streptococcus haemolyticus* were grown. In the presence of virulent *streptococcus haemolyticus* in abraded skins one might have expected erysipelatous infection. None was seen; but from the frequency with which lymphangitis and especially adenitis supervened and the ready response to sulphanilamide one must admit the streptococcus, if not as a causal agent, as an important cause of secondary infection.

I have had one case: a nursing orderly of the blue-eyed, fair haired, fair skinned type, who gave a history of recurring sores, I.A.T.s and furuncles, never being free from some form of skin sepsis for longer than two to three weeks. He had been treated on one occasion with massive doses of ascorbic acid. At another time I gave him one Italian Multivite Tablet three times a day for a week (vitamin A 2,000 i.u., vitamin B₁ 1 mgm., vitamin C 50 mgm., vitamin D 80 i.u. per tablet) without success. His last lesion was a folliculitis of the right fore-arm with adenitis. A culture showed *Staph. aureus* which was used to make an autogenous vaccine. He has now enjoyed a period of over two months without skin sepsis, is still free, and emphasizes a considerable improvement in his physical well-being.

SUMMARY.

The desert sore is peculiar to areas of similar climatic conditions which produce a devitalization of the epidermis facilitating epidermal inoculation; a certain type of skin being peculiarly susceptible.

• *Differential Diagnosis*.—The early lesion is typical. After seven days, without history of injury, it is difficult to differentiate from I.A.T.

Cutaneous Leishmaniasis.—Chronic and painless. Microscopic or cultural examination essential for accurate diagnosis in chronic sores.

Ulcus Tropicum.—Different distribution ; usually painless ; surrounding skin cedematous ; may spread to deeper tissues. Microscopic examination reveals spirochaetes and fusiform bacilli.

Prophylaxis.—(a) Wearing of long sleeves and slacks to protect arms and knees. (b) Application of cold cream to exposed parts after washing. The use of a quantity of German cream captured near Tobruk was found of considerable value in maintaining skin health and lessening the effects of the sun especially in the violently reacting fair type. (c) Susceptible individuals should be employed indoors as much as possible. The importance of this was demonstrated when a soldier had to be down-graded on account of his multiple oft-recurring sores and I.A.T.s. When down-graded he was employed in the Q.M. Stores pending transfer. The response of his lesions was striking and there was no recurrence while under observation. (d) Autogenous vaccine in selected cases. (e) Fomites should be protected from flies. (f) Of interest is Burns's (*Brit Med. Jour.*, June, 1943) suggestion that iron should be used. Eder (*Arch. Pæd.*, 1935) enabled children at his Sanatorium who were subject to sunburn effects to escape these by giving iron even though they were not anæmic.

Treatment.—Early treatment leads to early resolution. Bulla should be cut and hair epilated. Where much sepsis or slough is present hot eusol fomentations applied four-hourly are most effective. This is followed by a non-adherent dressing which should be left for a minimum of four days. One must beware of the oft-repeated use of sulphanilamide which might lead to skin sensitization and eczematoid dermatitis.

CHRONIC AMŒBIASIS IN SOLDIERS.

BY LIEUTENANT-COLONEL R. R. BOMFORD, D.M., F.R.C.P.,

Royal Army Medical Corps,

Officer in Charge of a Medical Division at a Military Hospital.

[Received July 18, 1944.]

WITH the return of troops from tropical and sub-tropical countries, cases of amœbiasis will be seen in increasing numbers by doctors who have relatively little previous experience of the condition. The object of this paper is to describe briefly the methods used in diagnosis and treatment of a series of cases admitted to a Military Centre for Tropical Diseases in England between November, 1942, and January, 1944 ; and, in so doing, to call attention to the necessity of looking for amœbiasis in many cases where the principal symptom is something other than diarrhœa; to the ill-effects of haphazard treatment and to the need for thoroughness and routine method in both diagnosis and treatment. While there is nothing in the paper that is new, there is a great deal which appears often to be neglected in practice and is presumably therefore unfamiliar. No attempt will be made to review the literature as this has recently been done most adequately by Manson-Bahr (1943) in a book to which all students of the dysenteries must be greatly indebted.

In the period mentioned, 112 patients were admitted diagnosed provisionally as suffering from dysentery or the effects of dysentery. Of these, 28 gave what was considered to be a reliable history of dysentery but no pathogenic organisms or protozoa were found in the stools and the symptoms were attributed to the effects of a previous dysentery ; 51 were found to have bacillary dysentery (including acute Sonne dysentery) as shown by the isolation of pathogenic organisms from the stools and 33 were considered to be suffering from amœbiasis. It is with these 33 cases that the remainder of this paper is concerned. Seventeen were officers, including nursing officers, and sixteen were other ranks. While cases from West Africa predominated there were others from North Africa, the Middle East, the Sudan, India, Burma and Ceylon. One patient had never been out of the United Kingdom and he appeared to have become infected in Northern Ireland. The length of the history was often difficult to determine with accuracy but varied from two months up to ten years.

PRESENTING SYMPTOMS.

Of the 33 patients in 7 only was recent diarrhœa the principal symptom. In a few more occasional diarrhœa was complained of but, in 14 cases, there was no history of recent diarrhœa and diarrhœa had never been a prominent symptom. Some of the patients with diarrhœa had noticed the presence of blood and mucus but others described their stools simply as watery or unformed. Other presenting symptoms were abdominal pain and discomfort, usually situated over the course of the colon or over the liver, "continuous aching abdominal pain," "stomach never really settled," "poor general health," slight fever, loss of weight, and in one case "loss of weight, ill-health and constipation." Four cases presented as a hepatitis, two with diarrhœa and two without.

DIAGNOSIS.

The diagnosis was suggested by : (1) A history of previous dysentery. (2) Previous residence in the tropics or sub-tropics with one or more of the symptoms mentioned above. (3) The presence of tenderness over the colon or liver. (4) The naked eye appearance of the stools which were occasionally characteristic, with blood, mucus and a typical odour, but more often simply watery or unformed.

The picture in chronic cases is therefore variable and may differ considerably from the usual clinical description of amœbic dysentery. The diagnosis was confirmed by :—

(1) *Microscopical Examination of the Stools*.—Vegetative *Entamœba histolytica* were found in 6 cases and cysts in 24. In looking for the latter much help was obtained from the use of a modification of the Faust (1939) zinc sulphate concentration method, details of which have, unfortunately, never been published. Not only is the detection of cysts made easier by its use but the fact that a large number of them can usually be examined in a clean field greatly facilitates their identification. At least three stools were examined by ordinary methods and three by the concentration method. In some cases many more were examined and in a few cases positive results were only obtained after repeated examinations. Since symptomless cyst carriers are not uncommon the finding of cysts in the stools does not necessarily mean that the symptoms are due to active amœbiasis nor is it necessarily an indication for treatment. In most of our cases, however, the satisfactory response to specific treatment seemed to show that the symptoms had been due to this cause.

(2) *Microscopical Examinations of Specimens Obtained at Sigmoidoscopy*.—Scrapings were taken with a Volkmann's spoon through the sigmoidoscope, mounted in normal saline under a cover slip and examined unstained. For this purpose the sigmoidoscope should be lubricated with mucilage as the presence of oil droplets, which will appear if any grease is used, makes the scrapings almost useless for microscopic examination. In this series of cases amœbæ were never found in scrapings of mucous membrane taken from a completely unbroken surface. They were however found in smears of bloody mucus seen coming down the sigmoid colon when no ulceration was visible ; and the particular importance of this method is shown by the fact that numerous active vegetative amœbæ were found in scrapings from two cases with ulceration after repeated examination of stools had failed to demonstrate amœbæ or cysts. One of these patients had not been abroad since 1932, when he had been in the tropics as a merchant seaman, but had suffered from diarrhœa almost continually for the last three years. His symptoms cleared up completely with specific therapy.

(3) *Sigmoidoscopic Appearances*.—One case only was diagnosed on sigmoidoscopic appearances when neither amœbæ nor cysts were found in direct films, concentrated specimens or scrapings. This patient had a history of previous amœbic dysentery followed by mild diarrhœa, aching abdominal pain and loss of weight, and he had a leucocytosis. The colon showed two ragged ulcers and elsewhere a hard leathery surface over which the end of the sigmoidoscope grated. With specific treatment the symptoms were relieved and the colon as seen through the sigmoidoscope returned almost to normal.

(4) *Response to Therapy given Empirically*.—With the exception of the case mentioned in the preceding paragraph, patients complaining of diarrhœa or colonic symptoms, in whose fæces no *E. histolytica* were found when direct films, concentrated specimens and scrapings of the mucous membranes had been systematically examined, rarely, if ever, in our experience, derived benefit from specific treatment for amœbiasis given empirically. The same statement does not of course apply to cases of hepatitis.

From what has been said it is evident that *E. histolytica* must be looked for in patients with many symptoms other than diarrhœa ; and that, though the common practice of examining one or two fresh specimens of stool may reveal them, many cases of chronic amœbiasis will be missed unless a routine procedure including repeated examinations of the stools, sigmoidoscopy and the examination of scrapings is employed.

TREATMENT.

Of the 30 cases in which this was recorded, 20 had been treated previously for amœbiasis and 10 had not. Of the 20 treated, 7 had received only injections of emetine hydrochloride, sometimes on several occasions. In almost every case this had produced temporary relief but the symptoms had soon returned. Only 7 of the 20 appeared to have been given an efficient course of E.B.I. and chiniofon retention enemata. A number more had been treated at different times with emetine, stovarsol and a few odd doses of emetine-bismuth-iodide or a

few odd enemata, sometimes of chiniofon and sometimes of other fluids not usually considered to be amoebicidal. It is probable that the chronic cases that reached us were not a fair sample of treated cases of amoebiasis and that the records of previous treatment were incomplete but, even so, they suggest that the treatment of this condition at the present time is often somewhat haphazard and casual. This is unfortunate, since chronic amoebiasis is a trying and disabling condition but one which is usually curable by thorough treatment at a reasonably early stage.

Of the standard drugs generally available—emetine, emetine-bismuth-iodide, auremetine, chiniofon (quinoxyl) and stovarsol or carbasone—it is generally agreed in England now that, whereas emetine hydrochloride by injection usually abolishes symptoms most satisfactorily, its effects are rarely permanent; that emetine-bismuth-iodide or auremetine given by mouth is the most effective single drug, and that the simultaneous administration of emetine-bismuth-iodide or auremetine and chiniofon retention enemata probably gives the highest proportion of permanent cures. Manson-Bahr (1941) claimed almost 100 per cent successful results in 535 cases treated by him, mostly with combined emetine-bismuth-iodide and chiniofon; others have not been so fortunate but there seems to be no doubt that a high proportion of cures can be obtained by this form of treatment particularly if the administration is carefully supervised and due attention is paid to details.

In the treatment of our cases emetine hydrochloride was used for two purposes only; for the treatment of hepatitis in which 12 daily injections of gr. 1 were given intramuscularly and, secondly, to control diarrhoea in patients with active dysentery, before other treatment was begun, for which purpose 3 or 4 injections were usually sufficient. All patients were treated with a course of emetine-bismuth-iodide by mouth and chiniofon retention enemata for twelve days followed by stovarsol for ten days. The minimum dosage, usually given to nursing officers who had not had this treatment previously, was emetine-bismuth-iodide, gr. 2 nightly, with 300 c.c. 2½ per cent chiniofon every morning as an enema to be retained for at least six hours. The maximum dosage, given to men in whom this treatment had failed before, was emetine-bismuth-iodide gr. 3 nightly and 300 c.c. of 5 per cent chiniofon. Most of the patients had six days of the lower dosage followed by six days of the higher. Stovarsol was given in doses of gr. 4 twice daily. In our experience this treatment was rarely depressing. In a few cases it failed completely. In the remainder there was a noticeable improvement in the patient's colour and general condition with a relief of symptoms during the course and, at the end of it, some patients stated that they felt better than they had done for months or even years. A few had difficulty in retaining their enemata for the required six hours on account of abdominal discomfort and diarrhoea. If this became distressing it was generally relieved by reducing the dose of emetine-bismuth-iodide. A few complained of soreness of the anus. One developed a severe generalized maculo-papular rash while taking stovarsol but this cleared up in a few days when the drug was discontinued. In one case the full course could not be given, as the patient was found to have serious delusions about the nature and purpose of the treatment.

It is unfortunately impracticable, under present conditions, to follow up these patients satisfactorily since some of them are already abroad again. The immediate results, for what they are worth, were on the whole satisfactory in the case of officers and unsatisfactory in the case of other ranks. Of the seventeen officers all had at least three negative stools after treatment, all were relieved of their main symptoms and all were considered fit to remain in the Service and continue duty. Of the sixteen other ranks, the treatment failed completely in three, that is to say cysts were still present and symptoms for all practical purposes unaltered after two complete courses of emetine-bismuth-iodide, chiniofon and stovarsol, and in the case of two of them an additional course of auremetine gr. 1 four times a day for ten days. Two were also given chiniofon by mouth for ten days without any effect. In three more the stools were cleared of cysts for the time being but the symptoms remained and the patients were in a poor mental and physical state. All these six patients were discharged from the Service. The remaining ten had at least three negative stools after treatment and

were considered fit to return to duty, mostly in Category "C" for home service. In about half of them the symptoms were substantially relieved. The remainder continued to have some symptoms but these were not considered disabling.

CAUSE OF FAILURE IN TREATMENT.

A most striking feature of this series of cases was the difference in the immediate results of treatment in the case of officers and nursing officers from other ranks. This is probably due mainly to the fact that the type of case was different in the two instances. Of the seventeen officers nine had had no previous treatment and, of the remainder, in only a very few had treatment been unsuccessful on more than one previous occasion. Of the troops only one had had no previous treatment. The majority had been treated unsuccessfully on many occasions abroad, had again been treated unsuccessfully in England and had only then as a last resort been transferred to the Centre for Tropical Diseases. The troops were therefore a selected sample of peculiarly intractable cases.

The reasons for failure in treatment are not fully understood but several possibilities are worth considering :—

(1) *Failure of Co-operation on the Part of the Patient.*—Of the troops a number had been under treatment abroad, in the process of evacuation to the United Kingdom, and under treatment at home with continuous diarrhoea and other symptoms for twelve months. They were a sorry crowd who, not unnaturally, had lost all faith in treatment and often only wanted to get out of the Army. Further, it was noticed that those in whom treatment failed completely were among the most difficult and disgruntled. The possibility that some of them were evading treatment by not swallowing their capsules or by surreptitiously passing their enemata had to be considered. Although these patients were kept under as close an observation as was possible in a big ward, no instance of attempted evasion of treatment was discovered.

(2) *Failure of the Coating of Emetine-bismuth-iodide Capsules to Dissolve.*—This danger has often been stressed and should be well known. It is probably greatest in warm climates and I have myself recovered undissolved orange coloured keratin-coated capsules from the stools of patients in this war.

If keratin-coated capsules or similar preparations are used it is essential that from time to time the stools should be strained through muslin to see whether undissolved capsules are present. If this does occur and no other preparation is available the capsules should be crushed and given in a spoonful of jam. I have treated a number of cases quite successfully in this manner, without producing undue nausea or vomiting. As orange coloured keratin-coated capsules have been used extensively in the Army in this war, it is possible that they have been one cause of failures in treatment. They were not used in the treatment of cases in this series and have now been withdrawn from general use.

(3) *Possible induced Emetine Fastness.*—Whereas the immediate results of treatment were highly satisfactory in all cases treated for the first or second time, the cases in which treatment was quite unsuccessful were all ones who had had repeated unsuccessful treatments previously. This might be simply explained by supposing that the latter cases had originally been infected with a strain of *E. histolytica* which was resistant to the action of amœbicides. It is however also possible, as suggested by Manson-Bahr (1941), that a state of emetine fastness is induced by repeated ineffective treatment. In the present state of knowledge it seems wise to recommend that emetine injections alone should be used only in an emergency or to tide a patient over for a short period till it is convenient for him to have other treatment. Until a better amœbicide is discovered all patients should be treated, as early as possible in the course of the disease, with a combined course of emetine-bismuth-iodide or auremetine and chiniofon retention enemata. Whenever possible, the effect of such treatment should be checked by further examinations of the faeces and sigmoidoscopy and the course of treatment should be repeated if a cure has not been obtained. Thereafter, ideally, the faeces should be re-examined in, say, three, six and twelve months time.

Organization of Treatment.—The adequate treatment of cases of chronic amœbiasis requires the co-operation of a physician who has some facility in the use of the sigmoidoscope ; a pathologist who is skilled in the detection and recognition of parasites of the fæces and nursing staff who understand and are prepared to give attention to the details of treatment. It would be an advantage if the treatment of this condition were only to be undertaken in places where these essentials are available. In any case it is highly desirable that patients whose disease has relapsed once should be transferred to such a place without further delay and before undue physical deterioration and mental hopelessness have supervened.

SUMMARY AND CONCLUSIONS.

Of the 112 patients admitted to a Military Centre for Tropical Diseases in England, suffering from dysentery or its effects, 33 were found to have amœbiasis. Only 1 had never been abroad.

The diagnosis was made on the finding of vegetative amœbæ in the fæces in 6, cysts in the fæces in 24, vegetative amœbæ in scrapings of mucous membrane taken through the sigmoidoscope in 2 and sigmoidoscope appearances alone in 1.

In 14 cases diarrhoea was not a recent complaint and had never been a prominent symptom. Cases of chronic amœbiasis will therefore be missed unless the condition is suspected in patients whose main symptom is something other than diarrhoea and unless a routine method, including repeated examinations of stools, sigmoidoscopy and examination of specimens taken through the sigmoidoscope, is followed in diagnosis.

The immediate results were, on the whole, satisfactory in the case of officers, all of whom were returned to duty, and unsatisfactory in the case of troops. The difference was probably due to the fact that the former were given efficient treatment earlier in the course of the disease than the latter.

It is suggested that emetine hydrochloride by injection should be used only for the treatment of hepatitis, in temporary emergencies, and to control diarrhoea before other treatment is begun. Until a better amœbicide is discovered all patients should be treated as early in their disease as possible with emetine-bismuth-iodide or auremetine and with chiniofon retention enemata. It is also suggested that vigorous and efficient treatment in the early stages, persisted in till there is laboratory and sigmoidoscopic evidence of cure, might prevent the development of a state of intractable symptoms, physical deterioration and mental hopelessness, which was seen in a few cases in this series.

My thanks are due to Colonel C. F. Anthonisz, Officer Commanding a Military Hospital, for permission to forward this paper ; to Colonel O. J. O'Hanlon, Officer Commanding the Hospital in which the observations were made ; to Majors J. S. F. Niven, J. Keall, and T. Crawford, Specialists in Pathology, whose willing co-operation alone made the work possible ; to the numerous medical officers and sisters who were concerned with the treatment of the cases and to Major-General A. G. Biggam for his advice and encouragement.

REFERENCES.

- FAUST, E. C., SAWITZ, W. *et al.* (1939). *J. Parasitol.* **25**, 241.
MANSON-BAHR, P. (1941). *Brit. med. Journ.*, **2**, 255.
Idem (1943). "The Dysenteric Disorders," Second Edition, London.

Clinical and Other Notes.

A NEW ZEALAND MOBILE V.D. TREATMENT CENTRE.¹

BY CAPTAIN N. C. BEGG,
New Zealand Medical Corps.

[Received October 16, 1944.]

Personnel.—Commanding Officer, 1; Serjeant, 1; Corporal (Clerk), 1. All Special Treatment Orderlies: Private Technician, 1; Private Quartermaster, 1; Private Special Treatment, 1; Private Cook, 1. Drivers A.S.C. attached, 1 for 15-cwt., 1 for 3-tonner.

Vehicles.—15-cwt. for use of C.O.; 3 ton laboratory.

Function.—(a) To treat as IN-patients all those who are simple cases and can probably return to Unit in three or four days. (b) To do all OUT-patients treatment for Division. (Including diagnosis, follow-up and final tests of cure.)

Site of Election.—Open M.D.S. Here it is possible to hold In-patients and yet it is forward enough to see Out-patients.

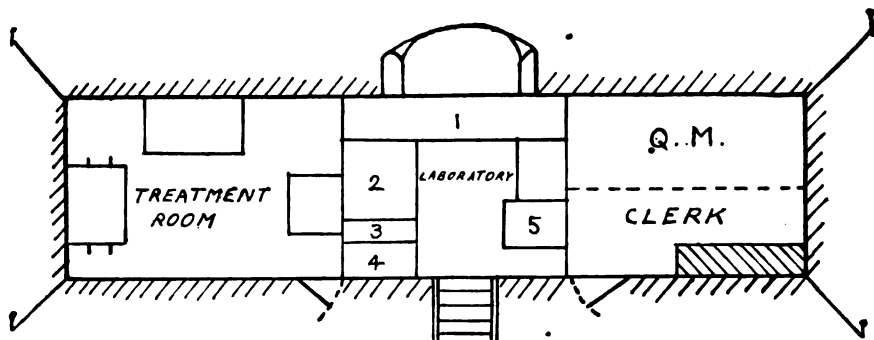
Scope.—In-patients can be held up to 12 or 15. They are issued with bedding, if necessary, and are cooked for. They should NOT be confined to bed and should have all their personal gear as they may have to be evacuated if the Unit moves.

New Cases.—ALL new cases should be sent to Venereologist in the first instance. He should diagnose and advise treatment.

If the patient returns to Unit, he should be given full instructions and all necessary medicine. His R.M.O. should carry out this treatment of the patient.

If the patient is admitted or evacuated further, his R.M.O. should be notified.

Old Cases.—All patients reporting for follow-up treatment should carry their surveillance card (N.Z. Form 25). On it is marked all dates concerning treatment or examination—it is used both for the patient's use and to convey the result of examination to R.M.O.



Layout of Unit In Field: Three-tonner fitted as Laboratory with 2-pent houses (12ft. by 10ft.).
1, Examination couch; 2, blood bench (anti-syph. and Laughlan); 3, staining sink; 4, microscope table; 5, clerk's table and records.

In addition there is (a) 180 lb. tent which can hold 10 cases; (b) 180 lb. tent (or RD small) for Cook's kitchen.

Unit and extra patients (above 10) sleep in bivouacs.

I think the 3-tonner should be a G.S. one and that fittings should not be too permanent.

¹This article was forwarded by Major-General F. T. Bowerbank, O.B.E., E.D., M.D., D.G. of M.S. (Army and Air), N.Z. Military Headquarters, to whom the Editor expresses his thanks.

All fittings should be movable so that in case of the truck being damaged they can be shifted to another G.S. truck.

I found the dangers of being too dependent on my 3-tonner when it was badly damaged during off-loading operations at a wharf.

I have fitted my 15-cwt. so that I can use it as an office and keep all my own records in it, interview patients, etc. It should not be immobilized by these fittings as it is frequently needed for carrying stores, reconnaissance and duties of a Q.M. vehicle.

Records.—A new case has I. 1247 filled in. All A.F. I. 1247's are held by Mobile V.D.T.C. while man is in Division. If soldier is evacuated for any reason, his I. 1247 is forwarded to Base V.D.T.C. Any man arriving in Division has I. 1247 forwarded from Base.

N.Z. Form 25. This is soldier's personal card and has all dates he is due back for surveillance placed on it. It is shown to Unit M.O., also to Venereologist when re-visiting.

The Unit should also keep its own records-by-units of treatments, diagnosis and dates of next appointment.

Quartering.—All Q.M. should be through Field Ambulance to which the Unit is attached. I have found it necessary to carry blankets and socks for men who are admitted straight from the line. All other clothing I get from the Field Ambulance.

It is often necessary to carry reserve of rations—seven or ten days. Also stocks of kerosene and petrol.

Medical.—Syphilis: The Laughlan test is accurate, the antigen is stable and the test has proved very valuable in the field as the Kahns do not arrive back quickly, especially if Unit is on the move.

Marpharsen has been hard to get and large stocks should be carried. Ampoules of distilled water are not always easy to procure.

It has been my policy to try and do ALL anti-syphilis treatment. However in certain cases this is not possible and I have given an emergency ration of 5 doses of N.A.B. and 10 doses of Bismuth to each R.M.O.

Simple Gonorrhoea has been treated fairly satisfactorily in the lines.

A good deal of our work is caring for and nursing mild cases of balanitis who can return to their Units in a few days. These people provide a problem when the Unit moves. I have overcome this by having: (a) An Advance Section consisting of C.O., Serjeant and Driver proceeding in 15-cwt. to new site and setting up. (b) A Nursing Section—the balance of the Unit—remaining for three or four days till patients are fit for return to Units or else evacuated, and then proceeding to join up with Advance Section.

CONCLUSIONS.

The Unit is about the right size. If I had to lose anyone I would prefer it to be the Cook. If I were allowed one further it would be a Special Treatment Orderly.

On the whole, the Unit is of serviceable size and with good equipment performs a useful service in the field.

A NOTE ON FIELD IMPROVISED APPLIANCES.

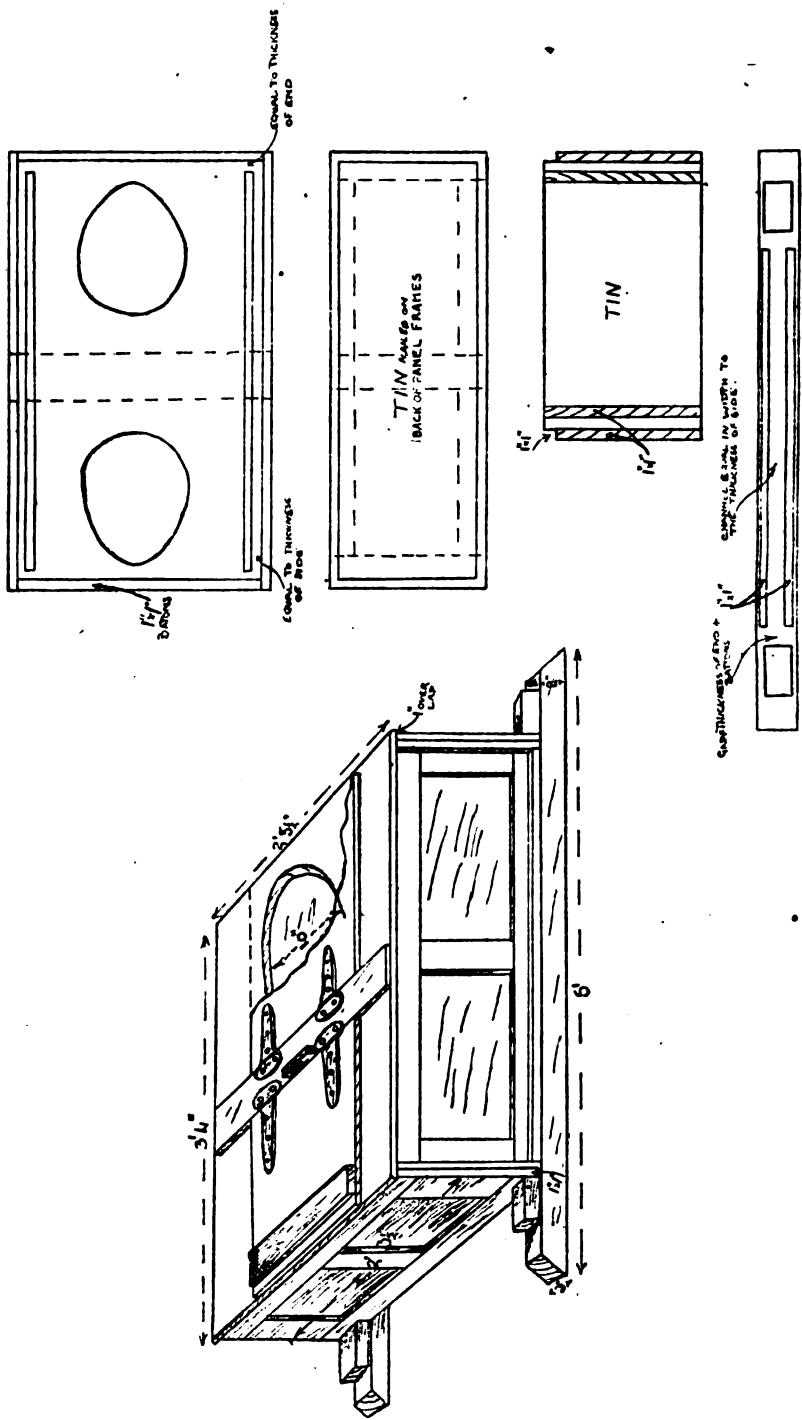
BY MAJOR M. MARKOWE,

Royal Army Medical Corps.

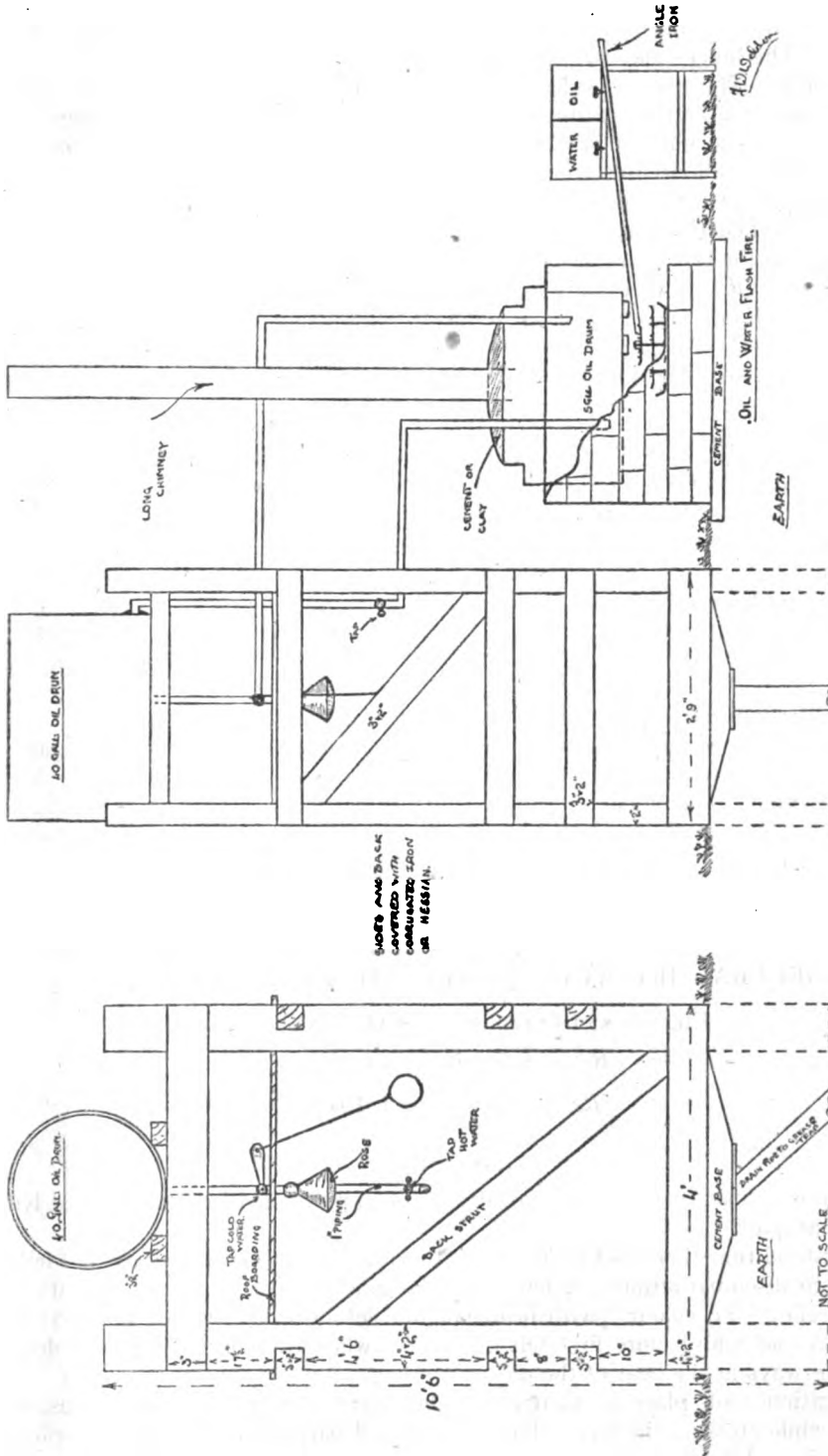
[Received September 3. 1943].

I.—PORTABLE LATRINE SUPERSTRUCTURE.

THIS superstructure has been in use since January, 1940, at home and in a tropical country. Its value has been demonstrated throughout a recent campaign. It is constructed from a wooden framework and the sides of 4-gallon non-returnable petrol tins, the sections being slotted together. It can be used in 2, 4, and 6 seater models, although for simplicity the 2-seater alone is illustrated.



Portable Lafrine (two-seater).



Semi-portable Field Shower.

Advantages.—(1) *Fly-proof.*—When well-seasoned wood is used the seat and frame remain unwarped even in the mid-summer sun of North Africa. There is little possibility of the tinned sections being torn or cracked as a result of misuse, as in the case of hessian-lined latrines. The hinges may be replaced with pieces of old outer tubes.

(2) *Portability.*—The seat and sides are readily erected as a superstructure, or taken down for transportation, in about one minute. These sections, together with the bearers, occupy a negligible space on the bottom of a 15-cwt. truck or any other vehicle and are therefore available to a unit in all circumstances.

(3) *Variety of Uses.*—Can be erected over a shallow trench (for midday halts, or short camps), a deep trench (for longer duration) or even buckets or petrol tins where trenches cannot be dug; in the latter case the receptacles must be emptied elsewhere.

(4) *Simplicity of design* and ready availability of materials.

(5) *Hygienic.*—Easy to keep clean as well as fly-proof.

Disadvantages.—(1) *Warping*—if constructed of unseasoned timber—but this is a defect with any wooden seat. The joints can always be proofed with sheet tin.

II.—SEMI-PORTABLE FIELD SHOWER.

Design and Principle.—(i) Water is fed to a 5-gallon (oil-drum) boiler from a 40-gallon (oil-drum) reservoir by gravity and heated by an oil and flash burner.

(ii) The heated water rises into the outlet pipe (and so to the rose) by convection currents and also because of the incoming flow of cold water.

(iii) Should the water be too hot, an additional cold water inlet is provided by means of a direct connexion from the reservoir to the rose.

(iv) The wooden superstructure may be covered with hessian (e.g. on A.A. sites) or may be dispensed with altogether by field units provided a tree or other support can be found for the reservoir.

(v) The boiler may be insulated by clay or bricks, whichever are available.

(vi) The rose may be improvised from a garden watering can or a perforated jam tin.

Remarks.—This shower was primarily designed for use by semi-static units (e.g. A.A. Guns and Searchlight detachments), and may be dismantled and, if necessary, reassembled on moving. It has proved its value to many such units and will provide sufficient baths for an independent unit the equivalent of a company, battery or squadron.

EFFECTS OF HEAT: AN ACCOUNT OF A GROUP OF CASES ADMITTED TO A GENERAL HOSPITAL ON ARRIVAL IN MIDDLE EAST.

BY LIEUTENANT-COLONEL J. HALLIDAY CROOM,

Royal Army Medical Corps.

[Received February 4, 1944.]

INTRODUCTION.

THESE men were part of a number of drafts who had proceeded from the United Kingdom in one large transport.

It is understood that there had been crowded conditions on board. Many had felt effects of heat prior to disembarkation. A few had been admitted to the Ship's hospital—many admitted to feeling "off colour" with headache and lethargy for the last few days prior to disembarkation and many more first felt symptoms when carrying kit up and downstairs and companion ways in the heat of the day.

Disembarkation took place in lighters. These were crowded and symptoms occurred among many while crossing the bay. This was noticed particularly among those accommodated in the centre of the lighters where presumably there was little circulating air.

Certain of the drafts were entrained and what proportion of these were affected is not

known. The remainder marched to a Transit Camp some four miles from the Quay. Skeleton Order was worn. The march took place in the heat of the day, the first cases reaching the hospital about 17.00 hours.

Many cases were vomiting undigested food and the one case which was immediately fatal had much undigested food in the stomach. Constipation was the rule. Many of the drafts had been instructed to restrict their fluid intake during the last few days of the voyage in an attempt to acclimatize them to desert conditions and no drinking was permitted during the march to the Transit Camp.

TREATMENT.

Accommodation.—(1) The Commanding Officer had arranged that a small stone duty hut situated between two of the huttet Medical Wards should be used as a Heat-Stroke Centre.

This was equipped with : two electric fans ; two iron bedsteads with waterproof sheets ; several four-gallon tins as receptacles for water ; one stirrup pump with rose attached to act as spray ; a tray equipped for giving i.v. quinine and morph. hyoscine.

Extra ice had been obtained as heat-stroke cases were expected and was issued as required. In practice three cases could be accommodated there at one time.

(2) A second improvised centre was set up in the M.I. Room on similar lines.

Segregation of Cases.—On arrival the cases were rapidly sorted by the Orderly Medical Officer at the reception tent. Those in coma or delirious or with axillary temperature of over 105° were at once driven to the Heat-Stroke Centre or given emergency treatment in the M.I. Room. The remainder were sent direct to the wards.

Emergency Treatment.—They were stripped and wrapped in a wet sheet and sprayed with iced water from the stirrup pump. The temperature was controlled RECTALLY. Every case in coma was found to have a rectal temperature of over 108° and the rectal temperature was found to exceed that in the axilla by at least 2° F.

If the rectal temperature did not fall to 107° or less within a few minutes an ICE COLD ENEMA was given, up to 3 pints of iced water being run in with tube and funnel. This was found to be very efficacious in reducing temperature and also washed out scybalous fæces.

Restlessness and convulsions were controlled by morphia gr. $\frac{1}{4}$ and hyoscine gr. 1/100. Quinine gr. v in 10 c.c. saline was given i.v. to comatose patients but, in this series, malaria was considered to be very unlikely.

Treatment in Wards.—All the severe cases were accommodated in one huttet ward. Less severe cases were admitted to tented wards. Sponging was carried out as necessary—if the axillary temperature exceeded 102°—rectal temperature not being taken in the milder cases. Several cases became restless and had generalized convulsions later in the evening. These were controlled by morphia and hyoscine. Fans were employed where available.

After-treatment.—Copious fluids, glucose and added salt with meals, were given. It was not found necessary to administer fluids parenterally as fluids were well tolerated by mouth as soon as the temperature was controlled. Ambulant cases were instructed to take several shower baths daily and bed patients were sponged as required. Mag. sulph. was given to all on the morning following admission and thereafter constipation dealt with as necessary. All severe cases were given luminal gr. $\frac{1}{2}$ b.d. for three days.

TOTAL NUMBER OF CASES—71

	Officers	Other Ranks
Total	3	68
Severity—		
(1) Severe heat stroke	—	9
(2) Heat stroke	—	16
(3) Heat exhaustion	3	43
	<hr/> 3	<hr/> 68

N.B.—Severe Heat Stroke — those with axillary temperature over 105° F. requiring treatment in centre.
 Heat stroke — those with axillary temperature 102°–105° F. requiring tepid sponging in wards.
 Heat exhaustion — those with symptoms of exhaustion, headache and thirst but axillary temperature of less than 102° F.

Clinical and Other Notes

Age groups.					Officers	Other Ranks
Below 20	..	..	..	..	—	1
20—30	..	..	..	..	—	44
30—40	..	..	..	..	3	22
40—50	..	..	..	..	—	1
					3	68

Medical category.					Officers	Other Ranks
A1	—	52
A2	—	5
A3	—	3
B1	—	4
B2	—	2
B3	—	1
B4	—	1
						68

It is regretted that officers categories were not noted.

Situation where Patients fell sick.					Officers	Other Ranks
(1)	Transfer from Ship's hospital	..	..	..	—	6
(2)	On H.M.T. but in hospital	..	..	..	—	19
(3)	On quay	..	..	..	—	10
(4)	On march	..	..	..	3	32
(5)	On train	..	..	..	—	1
					3	68

N.B.—Many of those with symptoms on H.M.T. did not actually report sick till reaching shore and passage in tender undoubtedly accentuated their symptoms.

Arms of the Service.					Officers	Other Ranks
Army	(1)	R.A.C.	..	..	—	9
	(2)	R.E.	..	..	—	16
	(3)	R.A.	..	..	—	3
	(4)	Infantry	..	..	1	28
	(5)	R.C.O.S.	..	..	—	4
	(6)	R.A.S.C.	..	..	1	6
	(7)	R.A.P.C.	..	..	1	—
R.A.F.	..	..	..	..	—	1
R.N.	..	..	..	..	—	1
					3	68
Disposal.	Detained	..	..	..	3	49

These cases were discharged to Transit Camp after forty-eight hours and recommended Attend "C" for five days.

One was readmitted with vomiting but this was not due to heat but to a chronic gastritis.

					Officers	Other Ranks
Admitted	—	19
Died	—	2
One died shortly after admission.						
One died July 1, 1942, in uræmia. P.M. showed evidence of chronic nephritis.						

					Officers	Other Ranks
Convalescent Depot	—	16
To U.K.	—	1*

*This man remained asthenic and complained of difficulty in concentration and general weakness.

CASE 1.	Blood Urea	Albuminuria	Urinary Deposit	
24 June, 1942 ..	.. 45 mgm.%	plus plus	Many epith. cells and oxalate crystals.	A few pus cells.
25 June, 1942 ..	.. —	plus plus	Ditto	ditto
26 June, 1942 ..	.. 45 mgm.%	faint trace	Occasional pus cells only	
27 June, 1942 ..	.. —	faint trace	N.A.D.	
28 June, 1942 ..	.. 32.5 mgm.%	nil	N.A.D.	

CASE 2.	<i>Blood Urea</i>	<i>Albuminuria</i>	<i>Urinary Deposit</i>
24 June, 1942 ..	60 mgm. %	plus plus	Fairly numerous W.B.C. Numerous granular casts
25 June, 1942 ..	—	nil	Uric acid crystals only
26 June, 1942 ..	45 mgm. %	trace	N.A.D.
27 June, 1942 ..	—	nil	A few pus cells only
28 June, 1942 ..	37.5 mgm. %	nil	N.A.D.
CASE 3.			
24 June, 1942 ..	120 mgm. %	plus	N.A.D.
25 June, 1942 ..	—	faint trace	N.A.D.
26 June, 1942 ..	37.5 mgm. %	nil	N.A.D.
27 June, 1942 ..	—	nil	N.A.D.
28 June, 1942 ..	—	nil	N.A.D.
CASE 4.			
23 June, 1942 ..	45 mgm. %	plus	Occasional hyaline cast R.B.C. and W.B.C.
24 June, 1942 ..	—	nil	—
25 June, 1942 ..	37.5 mgm. %	nil	Scanty W.B.C. hyaline casts
26 June, 1942 ..	—	nil	Uric acid crystals only
27 June, 1942 ..	—	nil	N.A.D.
CASE 5.			
23 June, 1942 ..	67.5 mgm. %	trace	Few W.B.C.
24 June, 1942 ..	—	trace	Numerous W.B.C.
25 June, 1942 ..	—	trace	N.A.D.
26 June, 1942 ..	52.5 mgm. %	nil	N.A.D.
27 June, 1942 ..	—	nil	N.A.D.
28 June, 1942 ..	—	nil	N.A.D.
CASE 6.			
23 June, 1942 ..	135 mgm. %	plus plus	Uric acid crystals
24 June, 1942 ..	—	plus plus plus	R.B.C. granular casts
25 June, 1942 ..	—	trace	N.A.D.
26 June, 1942 ..	37.5 mgm. %	trace	N.A.D.
27 June, 1942 ..	—	nil	N.A.D.
28 June, 1942 ..	—	nil	N.A.D.
CASE 7.			
23 June, 1942 ..	82.5 mgm. %	plus plus plus	Numerous hyaline and granular casts, many W.B.C.
24 June, 1942 ..	—	plus plus plus	Many granular casts
25 June, 1942 ..	—	nil	Scanty W.B.C. and R.B.C.
26 June, 1942 ..	22.5 mgm. %	nil	N.A.D.
27 June, 1942 ..	—	nil	N.A.D.
28 June, 1942 ..	—	nil	N.A.D.
CASE 8.			
23 June, 1942 ..	—	plus plus plus	Numerous granular casts
24 June, 1942 ..	97.5 mgm. %	plus plus plus	Many R.B.C. and granular casts
26 June, 1942 ..	270 mgm. %	plus plus plus	Ditto ditto
28 June, 1942 ..	367 mgm. %	plus plus plus	Ditto ditto
30 June, 1942 ..	415 mgm. %	plus plus plus	Ditto ditto
1 July, 1942 ..	400 mgm. %	plus plus plus	Ditto ditto
Died 1, July 1942, 13.40 hours.			

COMPLICATIONS.

- (1) Mild jaundice—two cases.
- (2) Transient diplopia and failure on accommodation—one case.
- (3) Prickly heat—almost 100 per cent.
- (4) Septic dermatitis—one case.

(5) Captain Reid, Pathologist, 13 General Hospital, estimated blood urea and examined the urine of the severe cases (*see table*). Eight of these showed evidence of transient urinary damage with raised blood urea, albuminuria and presence of cell casts and crystals in deposit. In all, they returned to normal within five days except one case which died of chronic nephritis.

CONCLUSIONS.

(1) There is no relation between age, medical category or arm of the Service to the occurrence of heat stroke in this group of cases.

(2) The axillary temperature, although useful as a routine method of diagnosis, is inferior to the rectal temperature in assessing progress in severe cases.

(3) Morphia and hyoscine are valuable in controlling restlessness and convulsions.

(4) Ice cold enemata are of great value in lowering temperature and at the same time clearing the bowel.

(5) Venesection would probably have benefited the one immediately fatal case if he had survived a little longer. Post mortem there was gross pulmonary oedema.

(6) In severe cases the urine should be examined and should show no abnormality before patient is discharged from hospital.

(7) In a hospital situated where heat stroke is likely to occur it is of great importance to have a special "centre" prepared. If one case occurs there will probably be many and these need immediate and energetic treatment.

My thanks are due to Colonel W. Russell, M.C., for permission to forward this paper, and to Lieutenant-Colonel J. C. Hawksley, R.A.M.C., for much help and guidance in the treatment of these cases.

DISTENSION DYSURIA.

By MAJOR S. M. LAIRD,
Royal Army Medical Corps.

[Received February 14, 1944.]

DYSURIA is a well-recognized symptom in organic disease of the genito-urinary tract. It is reported here as the sole symptom of a functional condition for which I have been consulted by numerous soldiers during the past four years and for which the descriptive term "distension dysuria" is suggested.

Distension dysuria occurs in despatch riders and drivers or in any personnel whose duties deny them normal opportunities for micturition. Such persons develop over-distension of the bladder from time to time in the course of their duties and subsequently experience dysuria on the first occasion they void urine from their over-distended bladder. No dysuria occurs if the patient has the opportunity to void when the first impulse to do so is experienced. Thorough examination of these cases has revealed no organic disease of the genito-urinary tract and no further dysuria has occurred after the cause has been explained to the patient and he has avoided over-distension of the bladder by responding to the first call to urinate.

Most medical officers have probably experienced distension dysuria themselves on some occasion when circumstances necessitated the postponement of urination for some considerable time after the normal impulse to empty the bladder has arisen. It is obvious that despatch riders and drivers of vehicles, especially on convoy and on exercises in this country, will often find themselves in such circumstances, and it is in these men that distension dysuria should be kept in mind when they report sick with this symptom. A careful case history is all important and the diagnosis should only be considered if the dysuria is confined to the FIRST urination following distension of the bladder. If the urine is normal on chemical examination the patient should be advised to avoid over-distension and should be seen again in two week's time. Distension dysuria may be diagnosed with confidence if he has remained symptomless during this period. All cases of dysuria which do not satisfy the above criteria should receive further investigation.

This note is published as no reference to this condition has been found in the various textbooks of urology which I have consulted and, if it is recognized, many negative cystoscopic and pyelographic studies will be saved.

Current Literature.

GLOVER, J. A. **War-time Decline of Acute Rheumatism.** *Lancet.* 1943, July 10, 51-2, 2 figs. [13 refs.]

In this short but significant paper Glover first describes the steady decline in the mean death rate from rheumatic fever, which had decreased from 87 per million in 1892 to one-seventh of that figure in 1942. Whereas in 1852, 11·2 per cent of all London hospitals admissions were for rheumatic fever, by 1914 this figure had fallen, according to Miller's figures for St. Bartholomew's, to 5 per cent.

Since the outbreak of the present war the decline in incidence of rheumatic fever has been even more marked. In 1939 the crude death rate from the disease was 23 per million, in 1940 it was 20·5, in 1941 it was 15·4 and in 1942 it had dropped to 12·1. With the exception of the figure for 1939 all these figures were new low records. A graphic illustration is given of the fall in death rate from rheumatic fever and its close correspondence with that from heart disease. The author quotes Bach as showing that the number of London elementary school children suffering from cardiac disease had steadily dropped from 2·1 per cent in 1923 to 0·77 per cent in 1937. In 1938 the figure was 0·68 per cent.

In discussing the probable causes of the decline, Glover finds that, although rheumatism schemes are important preventive measures, their efficiency declines in war-time and "can hardly be related to the sudden acceleration of the decline since war began." He considers an important factor in accelerating the decline to be the decrease in poverty due to abundant employment in war-time; additional factors are the greatly increased provision of milk for children and the decrease of urbanization due to evacuation. But he feels that it is probable that a subtle change is occurring in the relationship between man and *Streptococcus pyogenes*.

In speculating on the future, the author warns us that there have been several alternations in the history of scarlet fever in the last two centuries, between periods of extreme mildness and periods of great virulence. As the relationship between the epidemiology of rheumatic fever and that of scarlet fever is close, it is possible that another period of rheumatic virulence may occur. It is his opinion, however, that unless there be a great lowering of the standard of life the syndrome of juvenile rheumatism will not recover its evil prominence.

Reprinted from "Bulletin of Hygiene," Vol. 18, No. 12, 1943.

ANGEVINE, D. M., CECIL, R. L. and ROTHARD, S. **Influence of Various Types of Immunization on the Genesis of Experimental Hæmolytic Streptococcus Arthritis.** *Arch. Pathology.* 1942. July, v. 34, No. 1, 18-30, 2 figs. [10 refs].

Eighteen-hour broth cultures of a hæmolytic streptococcus were used for the preparation of formolized vaccine, nucleo-protein and filtrates. A living broth culture of the same strain, given intravenously in doses of 0·01-2 c.c., was used for the production of arthritis. Arthritis was found to develop more frequently in animals immunized with repeated intravenous injections of formolized streptococci than in either an intracutaneously immunized group or in control rabbits. Of 17 rabbits immunized intravenously and then given 2·0 c.c. of living broth culture 10 developed arthritis, while 50 per cent of animals given 0·1 c.c. of culture also developed joint lesions. Non-immune control rabbits given the larger dose of living organisms also developed arthritis in 66·6 per cent of cases, whereas among those given the smaller dose only 2 of 19 control animals developed joint lesions. Arthritis developed earlier in the immunized group of rabbits than in controls and it usually affected only one joint, whereas two or more joints were involved in the control group. When intra-articular injections of heat-killed hæmolytic streptococci or streptococcal nucleo-protein were given to normal rabbits

the synovial tissues of the joints were found to respond by a local inflammatory reaction to intravenous injections of living streptococci given ten days after the intra-articular injection. The inflammatory reaction in 15 rabbits which received intra-articular injections was found to be more extensive than in a control group of 11 animals. Five of these controls, however, developed inflammation of the joints. In animals which received intra-articular injections the inflammatory exudate in the synovial membrane was chronic and was characterized by lymphocytic foci, whereas in the control animals the synovitis was more acute. Intravenous injections of living streptococci produced a more extensive synovial reaction in the joints of rabbits which had been treated with intravenous injections of streptococcal vaccine than in those treated with either staphylococcal vaccine or horse serum.

Reprinted from "Bulletin of Hygiene," Vol. 18, No. 12, 1943.

Reviews.

THE VENEREAL DISEASES. A Manual for Practitioners and Students. By James Marshall M.B., B.S., M.R.C.S., L.R.C.P. London: Macmillan & Co., Ltd. 1944. Pp. xi + 348. Price 21s. net.

Marshall's "Venereal Diseases" contains within the space of 340 pages all that the average medical officer needs to know about the subject. The book is not intended for the expert, but rather for the student and practitioner; it is essentially practical and little space is devoted to the rarer manifestations of these diseases. There are four main sections on gonorrhœa, syphilis, other venereal diseases and technique respectively, with a very useful appendix on the sociology of V.D. This last brings home to all medical men that in undertaking the treatment of a patient suffering from V.D. they owe a duty to the public, i.e. to trace and if possible bring under treatment all infected contacts; only so is there any hope of eradicating V.D. The sections on gonorrhœa and syphilis are in accordance with modern ideas, the sulphonamides are well handled and the treatment of early syphilis is very thorough; unfortunately the wide use of penicillin which may well revolutionize the treatment of both diseases came too late for more than a brief reference. Other venereal and allied diseases are only allotted some 20 pages but this was probably necessitated by limitations of space. The section on technique is a most valuable one and will be very helpful to all who treat V.D. but who do not count themselves amongst the experts. The literary style of this book leaves much to be desired and there are numerous grammatical errors which will no doubt be corrected in future editions, but the subject-matter is eminently sound and the illustrations, especially the coloured plates, are quite first class. This book deserves a wide circulation.

T. E. O.

CLINICAL PRACTICE IN INFECTIOUS DISEASES. Second Edition. By E. H. R. Harries, M.D.Lond., F.R.C.P., D.P.H., and M. Mitman, M.D.Lond., M.R.C.P., D.P.H. Edinburgh: E. & S. Livingstone. 1944. Pp. xii + 570. Price 22s. 6d.

The second edition of this book has been remodelled and great improvement has resulted therefrom. In spite of more economical arrangement of type and the omission of several tables, the book has increased by about a hundred pages. At the head of each chapter there is a helpful synopsis which has replaced the somewhat dull catalogue at the end of the chapters in the previous edition. This innovation is a tremendous asset. There is much new material which includes modern views on the paths of infection while meningococcal infections are dealt with more fully. At the end of each chapter there is a very good bibliography which will be of great assistance to those who wish to study any particular subject more fully.

The first four chapters, which deal with infection and resistance, hyper-sensitiveness,

allergy and the transmission of infectious diseases, are well written and are so explicit that some of the figures that remain could be replaced by a description of some other infection sometimes seen in this country, such as anthrax or leprosy. Then follow chapters giving the clinical features and epidemiology not only of a wide range of the more common infections but also including epidemic encephalitis, infectious enteritis of children, psittacosis, infective hepatitis, epidemic typhus, influenza and tetanus. One of the weakest portions of this good book is that concerning the treatment of acute and chronic amœbic dysentery. The authors rightly emphasize the pitfalls in the differential diagnosis between smallpox and chicken-pox and do their best to show how, in the majority of circumstances, a correct diagnosis can be made provided due care in consideration of all the clinical features is taken. All the same, there must be that minority of instances where it is wellnigh impossible to differentiate between variola minor and varicella at a critical stage when an accurate diagnosis is essential for the safety of all.

The last four chapters are devoted to the management of infectious disease by therapeutics, by isolation, by dietary measures and control in hospitals.

In the reviewer's opinion "Clinical Practice in Infectious Diseases" is the best exposition both of the clinical features and of the general management of these illnesses that has been published. There are a few glaring typographical errors but these in no way detract from a well-written, concise and complete up-to-date work which will undoubtedly appeal to students and, as a book of reference, to practitioners and consultants alike.

MEDICAL DISEASES OF WAR. Fourth Edition. By Sir Arthur Hurst, M.A., D.M., F.R.C.P.
London: Edward Arnold & Co. 1944. Pp. viii + 511. Price 21s. net.

During periods of war certain diseases, tropical and otherwise, assume unusual importance as far as Service personnel are concerned. It is well, therefore, that this group of diseases should be brought together in one volume of such a convenient size that it can be easily taken about by Medical Officers serving with the armed forces. The new edition of Medical Diseases of War by Sir Arthur Hurst contains much new material. The chapter on Infective Hepatitis has been rewritten and now sets out the present views on the pathogeny of this condition; sciatica is also given adequate consideration.

It is a pity that the section on Typhus does not mention up-to-date views on the value of protective vaccination nor include a word about the new persistent insecticides. The value of the sulphonamides in the treatment of bacillary dysentery is emphasized, but perhaps too little emphasis is laid on the danger of producing a chronic amœbic state by the use of emetine injection alone in the treatment of protozoal dysentery.

The results of recent researches into the treatment of malaria are well set out in the section on Malaria. The view that mepacrine is a causal prophylactic is, however, as a result of further investigation, not now generally maintained. This is a very valuable publication and well worth adding to one's medical library.

VICTORIES OF ARMY MEDICINE. By Colonel Edgar Erskine Hume, M.C., U.S. Army.
London: J. B. Lippincott Company. 1943. Pp. xiv + 250.

The United States Medical Department are fortunate indeed to have a medical historian of the calibre of Colonel E. E. Hume to record their glorious and many-sided history in the glowing pages of his engrossing and excellently documented "Victories of Army Medicine." Wartime exigencies of space and paper unfortunately preclude other than the briefest and most superficial of reviews.

One is struck, at the outset, by the wide interests of U.S. Army medicos, both within and outside the bounds of Medicine. For instance, an imposing list of members of the Medical Department who have achieved high office in non-medical branches of the Army includes two Secretaries for War (W. Eustis and J. McHenry); a Chief of Staff and, incidentally, an unsuccessful candidate for the Presidency of the United States (Leonard Wood); and an

Adjutant General (F. C. Ainsworth). No parallel to these "extra-mural" achievements exists, as far as I am aware, in our own Medical Corps.¹

Again, some of the greatest ornithologists in the history of the United States were military medical men who, in many instances, took up the fascinating study of birds and their habits as an antidote to the monotony of life in some lonely out-station in the far or middle west.

As in the case of our own Corps, the contributions of U.S. medical men to Tropical Medicine have been great and many have achieved the widest of international renown.

Names such as W. C. Gorgas, Walter Reed, Hans Zinsser, R. P. Strong are picked at random from a host who have added lasting lustre to this fascinating branch of Medicine.

A notable feature of the book is an extensive series of unusually clear portraits, mostly borrowed from the magnificent Army Medical Library or Museum, of men of note in the U.S. Army Medical Corps; these include a well-produced coloured print of that fine all-round administrator, Colonel John Shaw Billings, who numbered amongst his many achievements the development of the famous Surgeon General's Library (now the Army Medical Library), Washington, and its valuable Index Catalogue.

Another coloured reproduction of great historical interest depicts Surgeon J. W. Lazear inoculating Assistant Surgeon Carroll with the serum of a yellow fever patient in the presence of a distinguished company which included Major-General Leonard Wood, then Governor of Cuba, Dr. Carlos Finlay, and Major Walter Reed. It is interesting to note that Carroll and Lazear both contracted the disease, the latter dying after having permitted an infected mosquito to bite him, a martyr to science.

Yet another coloured plate shows Surgeon William Beaumont drawing off gastric juice from the gastric fistula of the elusive French Canadian Alexis St. Martin, a valuable milestone in the elucidation of the physiology of gastric secretion.

Interesting sections deal with the Military Nursing Service, established in 1901 as the Army Nurse Corps; the Dental Corps; and the Veterinary Corps which has been, since 1916, one of the branches of the Medical Department of the Army.

Needless to say, the "set up" and printing of the book are excellent and both author and publishers are to be congratulated on a first-class production which is, in its most comprehensive sense, "easy on the eye," no mean achievement in these days of paper and labour shortage.

¹Lieutenant-General Sir John Goodwin, K.C.B., K.C.M.G., D.S.O., F.R.C.S., became Governor of Queensland (Australia).—Ed.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

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All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

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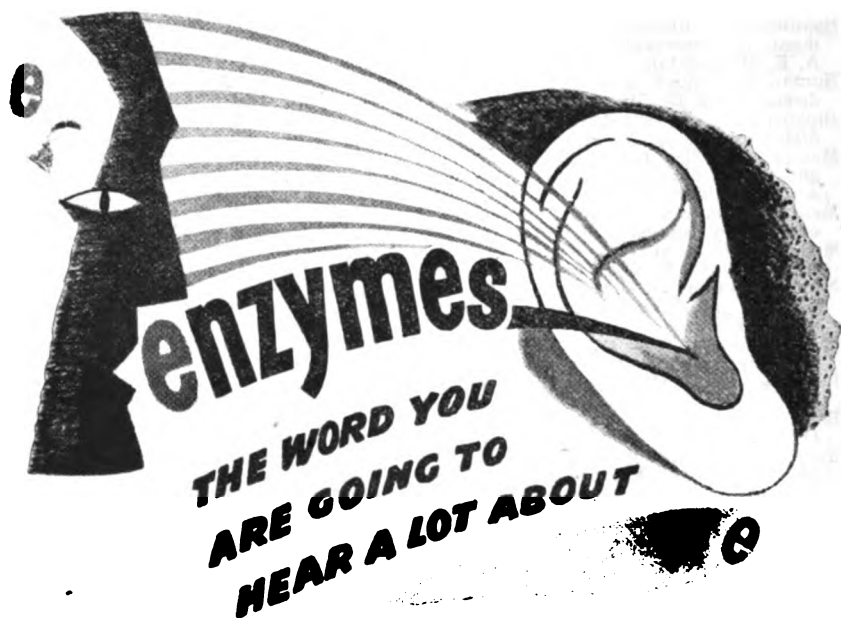
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EDITED BY

COLONEL G. W. WILL, *O.B.E.*

ASSISTANT EDITOR :

LIEUTENANT-COLONEL P. J. L. CAPON, R.A.M.C.

MANAGER :

LIEUTENANT-COLONEL C. A. WHITFIELD, R.A.M.C.

VOL. LXXXIII.

July—December, 1944.



JOHN BALE AND STAPLES LIMITED
83-91 GREAT TITCHFIELD STREET LONDON W 1

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

Corps News.

DECEMBER, 1944.

EXTRACTS FROM THE "LONDON GAZETTE."

November 10, 1944.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of gallant conduct in carrying out hazardous work in a very brave manner:—

To be Additional Members of the Military Division of the said Most Excellent Order:—

Sister Miss Ruby Esther Stainton (209238), Queen Alexandra's Imperial Military Nursing Service Reserve (Alsager, Stoke-on-Trent).

Sister Miss Dorothy Stringfellow (209341), Queen Alexandra's Imperial Military Nursing Service Reserve (Harrogate).

Sister Miss Doreen Thompson (221081), Queen Alexandra's Imperial Military Nursing Service Reserve (Rathdowney, Eire).

Sister Miss Phyllis Mary Thorpe (274610), Queen Alexandra's Imperial Military Nursing Service Reserve (Yardley, Birmingham).

November 16.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished service in the field.

Capt. J. P. Irwin (202416), Royal Army Medical Corps.

November 16.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished service in Italy:—

Major (temp. Lt.-Col.) E. J. Selby, O.B.E. (104011), Royal Army Medical Corps.

November 16.—The KING has been graciously pleased to confer The Efficiency Decoration upon the following officers of the Territorial Army.

Royal Army Medical Corps.

Col. R. I. Poston (40051).

Lt.-Col. (temp. Col.) J. P. J. Jenkins (48626).

Lt.-Col. (Acting Col.) I. G. W. Hill (50301).

Major (temp. Lt.-Col.) N. Capstaff (28949).

Major (temp. Lt.-Col.) W. M. Evans, M.C. (41885).

Major (temp. Lt.-Col.) A. J. King (41341).

Major (temp. Lt.-Col.) H. S. Ward, O.B.E. (33741).

November 7.—Col. K. Comyn, M.D. (4956), late R.A.M.C., on completion of four years in the rank, retires on ret. pay and remains employed, November 9, 1941. (Substituted for the notifi. in Gazette (Supplement) dated November 11, 1941.)

Col. J. Rowe, M.C., M.B. (8101), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to establ't., November 5, 1944.

Lt.-Col. G. P. Kidd, M.C. (5799), from R.A.M.C., to be Col. November 5, 1944, with seniority from May 26, 1941.

Major F. C. Hilton-Sergeant, M.B. (26337), to be Lt.-Col. November 5, 1944.

Capt. R. H. Huht (63799) to be Major, October 25, 1944.

Capt. E. J. Pryn (65534) to be Major, October 25, 1944.

November 10.—Col. (temp. Maj.-Gen.) T. O. Thompson, C.B.E., D.M. (4850), late R.A.M.C., to be Maj.-Gen., November 11, 1944.

Lt.-Col. J. Biggam, M.C., M.B. (5079), to be Col. Nov. 11, 1944, with seniority from June 25, 1941.

Major-Gen. Sir Percy S. Tomlinson, K.B.E., C.B., D.S.O., F.R.C.P., K.H.P. (5847), late R.A.M.C., having reached the age for retirement, retires on ret. pay, Nov. 11, 1944.

Lt.-Col. W. K. Campbell, D.S.O., M.B.E., M.C., M.B. (8649), having attained the age for retirement, is retained on the Active List supern. to establ't., Nov. 12, 1944.

Major (War Subs. Lt.-Col.) W. L. Spencer-Cox, O.B.E., M.C. (24005), to be Lt.-Col. Nov. 11, 1944.

Major F. J. O'Meara, M.D., F.R.C.P.I. (26774), to be Lt.-Col. Nov. 12, 1944.

Short Service Comms.—The undermentioned offrs. from R.A.M.C. are granted short-service comms. in the rank of Lt.:—

Capt. John Barker Neal (47440), from T.A. Aug. 24, 1939, and to be Capt., Aug. 24, 1940.

Capt. Robert George Watson Ollerenshaw (66630) from T.A., Aug. 24, 1939, and to be Capt., Aug. 24, 1940.

Capt. Edwin George Wright, M.B. (87017) from T.A., Aug. 24, 1939, and to be Capt. Aug. 24, 1940.

Capt. Richard Leonard Marks, M.B. (89376) from T.A., Aug. 24, 1939, and to be Capt. Aug. 24, 1940.

Capt. Lewis Ernest Charles Davies, M.B. (96670) from T.A., Aug. 24, 1939, and to be Capt. Aug. 24, 1940.

Capt. James Buist Evans (85176) from T.A., Aug. 25, 1939, and to be Capt., Aug. 25, 1940.

Capt. William Lane Petter, M.B. (96903) from T.A., Aug. 29, 1939, and to be Capt., Aug. 29, 1940.

Capt. William George Bateson, M.B. (67841) from Supp. Res. of Offrs., Sept. 1, 1939, and to be Capt., Sept. 1, 1940.

Capt. Hugh Macan Rice, M.B. (85929) from Supp. Res. of Offrs., Sept. 1, 1939, and to be Capt., Sept. 1, 1940.

Capt. (War Subs. Major) Charles Edward Stuart, M.B. (92426) from Supp. Res. of Offrs., Sept. 1, 1939, and to be Capt., Sept. 1, 1940.

Capt. (War Subs. Major) Peter Howard Short-house (86846) from T.A., Sept. 1, 1939, and to be Capt. Sept. 1, 1940.

Capt. Martin Mead Lewis, M.B. (87791) from T.A., Sept. 1, 1939, and to be Capt., Sept. 1, 1940.

Capt. Trevor Griffiths (89912) from T.A., Sept. 1, 1939, and to be Capt., Sept. 1, 1940.

Capt. Patrick Charles Mitchell, M.B. (63705) from T.A., Sept. 2, 1939, and to be Capt. Sept. 2, 1940.

Capt. Robert Maxwell Johnstone, M.B. (56428) from T.A., Sept. 2, 1939, and to be Capt., Sept. 2, 1940.

Lt. (War Subs. Capt.) Thomas Patrick Hubert McKelvey, M.B. (88473) from T.A. Res. of Offrs., Sept. 2, 1939, and to be Capt., Sept. 2, 1940.

Lt. (War Subs. Capt.) William Ronald West West-Watson, M.B. (89803), from Supp. Res. of Offrs. Sept. 4, 1939, and to be Capt. Sept. 4, 1940.

Lt. (War Subs. Capt.) Kenneth Mackenzie Bell, M.B. (99327) from Emergency Comm., Sept. 5, 1939, and to be Capt., Sept. 5, 1940.

Lt. (War Subs. Capt.) Alistair MacDougal Maiden, M.B. (99420) from Emergency Comm., Sept. 7, 1939, and to be Capt. Sept. 7, 1940.

Lt. (War Subs. Maj.) John Mackenzie Matheson, M.D. (69803) from T.A., Sept. 15, 1939, and to be Capt., Sept. 15, 1940.

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Lt. (War Subs. Capt.) Stanley Boan, M.B. (98369) from Emergency Comm. Sept. 23, 1939 and to be Capt., Sept. 23, 1940.

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Lt. (War Subs. Capt.) Patrick Gerard McGrath, M.B. (101956) from Emergency Comm. Oct. 24, 1939 and to be Capt. Oct. 24, 1940.

Lt. (War Subs. Capt.) Sydney Jacob Hepworth, M.B. (100963) from Emergency Comm. Oct. 31, 1939 and to be Capt. Oct. 31, 1940.

Lt. (War Subs. Capt.) Louis Griffiths (107763) from Emergency Comm. Nov. 4, 1939 and to be Capt. Nov. 4, 1940.

Lt. (War Subs. Capt.) Charles Frazer Murison, M.B. (100997) from Emergency Comm. Nov. 7, 1939 and to be Capt. Nov. 7, 1940.

Lt. (War Subs. Capt.) Robert Imrie Mitchell, M.B. (70600) from T.A., Nov. 10, 1939 and to be Capt. Nov. 10, 1940.

Lt. (War Subs. Capt.) Edward Theodore Gilbert, M.B. (108109) from Emergency Comm. Nov. 12, 1939 and to be Capt. Nov. 12, 1940.

Lt. (War Subs. Capt.) Dennis Bruce Seymour-Price (127775) from Emergency Comm. Nov. 16, 1939 and to be Capt. Nov. 16, 1940.

Lt. (War Subs. Capt.) Reginald John Gray, M.B. (112038) from Emergency Comm. Nov. 20, 1939 and to be Capt. Nov. 20, 1940.

Lt. (War Subs. Capt.) John William Scholey, M.B. (110689) from Emergency Comm. Nov. 21, 1939 and to be Capt. Nov. 21, 1940.

Lt. (War Subs. Capt.) Terence Henry Bassett, M.B. (108783) from Emergency Comm. Nov. 22, 1939 and to be Capt. Nov. 22, 1940.

Lt. (War Subs. Capt.) Stephen MacKenzie (111761) from Emergency Comm. Nov. 23, 1939 and to be Capt. Nov. 23, 1940.

Lt. (War Subs. Capt.) Henry Gray Skinner, M.B. (111584) from Emergency Comm. Nov. 29, 1939 and to be Capt. Nov. 29, 1940.

Lt. (War Subs. Capt.) Kevin Francis Patton, M.B. (111780) from Emergency Comm. Nov. 29, 1939 and to be Capt. Nov. 29, 1940.

Lt. (War Subs. Capt.) James Parlane Baird, M.B. (115469) from Emergency Comm. Dec. 12, 1939 and to be Capt. Dec. 12, 1940.

Lt. (War Subs. Capt.) Ian Easton Dawson, M.B. (112638) from Emergency Comm., Dec. 14, 1939 and to be Capt. Dec. 14, 1940.

Lt. (War Subs. Capt.) Robert Alexander Pyper, M.B. (114765) from Emergency Comm. Dec. 20, 1939 and to be Capt. Dec. 20, 1940.

Lt. (War Subs. Capt.) Thomas Alexander Groves, M.B. (115171) from Emergency Comm. Dec. 29, 1939 and to be Capt. Dec. 29, 1940.

Lt. (War Subs. Capt.) Hugh Alistair Reid, M.B. (115776) from Emergency Comm. Jan. 8, 1940 and to be Capt. Jan. 8, 1941.

Lt. (War Subs. Capt.) Ernest Lionel Ouseley Hood, M.B. (115984) from Emergency Comm. Jan. 9, 1940 and to be Capt. Jan. 9, 1941.

Lt. (War Subs. Capt.) Ian Alistair Walsh, M.B. (120755) from Emergency Comm. Jan. 31, 1940, and to be Capt. Jan. 31, 1941.

Lt. (War Subs. Capt.) John Edward Buck, M.B. (120153) from Emergency Comm. Feb. 1, 1940 and to be Capt. Feb. 1, 1941.

Lt. (War Subs. Capt.) William Ronald Lamb, M.B. (122729) from Emergency Comm. Feb. 9, 1940, and to be Capt. Feb. 9, 1941.

Lt. (War Subs. Capt.) John Herbert Horatio Balmer (127186) from Emergency Comm. Feb. 19, 1940 and to be Capt. Feb. 19, 1941.

Lt. (War Subs. Capt.) Ross Mackenzie Henderson, M.B. (125003) from Emergency Comm. Feb. 26, 1940 and to be Capt. Feb. 26, 1941.

Lt. (War Subs. Capt.) Stephen Martin Patrick Conway (127184) from Emergency Commn. Mar. 11, 1940, and to be Capt. Mar. 11, 1941.

Lt. (War Subs. Capt.) Frederick Grafton Lougee (127143) from Emergency Commn. Mar. 26, 1940 and to be Capt. Mar. 26, 1941.

Lt. (War Subs. Capt.) James Nathan Threlfall, M.B. (127841), from Emergency Commn., Apr. 1, 1940, and to be Capt., Apr. 1, 1941.

Lt. (War Subs. Capt.) William Henry Whymant, M.B. (128688), from Emergency Commn., Apr. 6, 1940, and to be Capt., Apr. 6, 1941.

Capt. (War Subs. Major) Alastair Donald Young, M.B. (128689), from Emergency Commn., Apr. 6, 1940, and to be Capt., Apr. 6, 1941.

Lt. (War Subs. Capt.) Thomas Eglington•Field, M.B. (128653), from Emergency Commn., Apr. 12, 1940, and to be Capt., Apr. 12, 1941.

Lt. (War Subs. Capt.) Denis Hugh Robert Montgomery (128376), from Emergency Commn. Apr. 20, 1940, and to be Capt., Apr. 20, 1941.

Lt. (War Subs. Capt.) Harold William Peck (128979), from Emergency Commn., Apr. 20, 1940, and to be Capt., Apr. 20, 1941.

Lt. (War Subs. Capt.) Robert Montgomery, M.B. (128573), from Emergency Commn., Apr. 22, 1940, and to be Capt., Apr. 22, 1941.

Lt. (War Subs. Capt.) Bernard Andrew, M.B. (131350), from Emergency Commn., May 2, 1940, and to be Capt., May 2, 1941.

Lt. (War Subs. Capt.) Ian MacPhail, M.B. (131322), from Emergency Commn., May 6, 1940, and to be Capt., May 6, 1941.

Lt. (War Subs. Capt.) Terence Reginald Wilson, M.B. (131708), from Emergency Commn., May 10, 1940, and to be Capt., May 10, 1941.

Lt. (War Subs. Capt.) Norman Dupre Lance (133191), from Emergency Commn., May 10, 1940, and to be Capt., May 10, 1941.

Lt. (War Subs. Capt.) Paul Bell Longden (133192), from Emergency Commn., May 10, 1940, and to be Capt., May 10, 1941.

Capt. (War Subs. Major) Denis Henry Dryburgh Burbridge (135393), from Emergency Commn., May 29, 1940, and to be Capt., May 29, 1941.

Lt. (War Subs. Capt.) Adrian Murray Gall (133622), from Emergency Commn., June 1, 1940, and to be Capt., June 1, 1941.

Lt. (War Subs. Capt.) George Robert Marshall (135685) from Emergency Commn., June 1, 1940, and to be Capt., June 1, 1941.

Lt. (War Subs. Capt.) David Broadfoot Watson, M.B. (136270), from Emergency Commn., June 18, 1940, and to be Capt., June 18, 1941.

Lt. (War Subs. Capt.) Alexander Leonard Black, M.B. (135663), from Emergency Commn., June 20, 1940, and to be Capt., June 20, 1941.

Lt. (War Subs. Capt.) George Sinclair Caithness, M.B. (133951), from Emergency Commn., June 27, 1940, and to be Capt., June 27, 1941.

Lt. (War Subs. Capt.) Ronald Davie Lewis Davies, M.B. (135271), from Emergency Commn., July 1, 1940, and to be Capt., July 1, 1941.

Lt. (War Subs. Capt.) Ernest John Bowmer, M.B. (139127), from Emergency Commn., July 3, 1940, and to be Capt., July 3, 1941.

Lt. (War Subs. Capt.) Henry Oswald Patrick McSheehy (142095), from Emergency Commn., Aug. 1, 1940, and to be Capt., Aug. 1, 1941.

Lt. (War Subs. Capt.) Thomas Welsh Carrick, M.B. (154131), from Emergency Commn., Oct. 26, 1940, and to be Capt., Oct. 26, 1941.

Lt. (War Subs. Capt.) Arthur James Fulthorpe,

M.B. (154546), from Emergency Commn., Nov. 8, 1940, and to be Capt., Nov. 8, 1941.

Lt. (War Subs. Capt.) Ieuan Myrddin Davies (159679), from Emergency Commn., Dec. 6, 1940, and to be Capt., Dec. 6, 1941.

Lt. (War Subs. Capt.) Roger West (159750), from Emergency Commn., Dec. 12, 1940, and to be Capt., Dec. 12, 1941.

Lt. (War Subs. Capt.) John Irvine, M.B. (161275), from Emergency Commn., Dec. 13, 1940, and to be Capt., Dec. 13, 1941.

Lt. (War Subs. Capt.) Robert Hastings Smythe (163382), from Emergency Commn., Dec. 19, 1940, and to be Capt., Dec. 19, 1941.

Capt. (War Subs. Major) Ernest John Ewell (163704), from Emergency Commn., Jan. 9, 1941, and to be Capt., Jan. 9, 1942.

Lt. (War Subs. Capt.) John Esmond Gastineau Earle (169071), from Emergency Commn., Jan. 16, 1941, and to be Capt., Jan. 16, 1942.

Lt. (War Subs. Capt.) Lancelot Ruthven Dalton (169116), from Emergency Commn., Jan. 24, 1941, and to be Capt., Jan. 24, 1942.

Lt. (War Subs. Capt.) John Edmund Vooght, M.B. (169481), from Emergency Commn., Jan. 31, 1941, and to be Capt., Jan. 31, 1942.

Lt. (War Subs. Capt.) John Scorgie, M.B. (175384), from Emergency Commn., Feb. 28, 1941, and to be Capt., Feb. 28, 1942.

Lt. (War Subs. Capt.) Christopher Carruthers Corfield (181477), from Emergency Commn., Apr. 10, 1941, and to be Capt., Apr. 10, 1942.

Lt. (War Subs. Capt.) James Wilson Taylor, M.C., M.B. (181814), from Emergency Commn., April 10, 1941, and to be Capt., April 10, 1942.

Lt. (War Subs. Capt.) Hector Marshall Upshon (183478), from Emergency Commn., April 17, 1941, and to be Capt., April 17, 1942.

Lt. (War Subs. Capt.) James Hurrie Brodie, M.B. (183775), from Emergency Commn., April 24, 1941, and to be Capt., April 24, 1942.

Lt. (War Subs. Capt.) John Francis Webb, M.C., M.B. (202345), from Emergency Commn., Aug. 28, 1941, and to be Capt., Aug. 28, 1942.

Lt. (War Subs. Capt.) Edward Maurice Ensor (205568), from Emergency Commn., Sept. 27, 1941, and to be Capt., Sept. 27, 1942.

Lt. (War Subs. Capt.) Hugh Morton Macfie, M.C., M.B. (216202), from Emergency Commn., Nov. 8, 1941, and to be Capt., Nov. 8, 1942.

Lt. (War Subs. Capt.) John William Ralph Battram (216667), from Emergency Commn., Nov. 29, 1941, and to be Capt., Nov. 29, 1942.

Lt. (War Subs. Capt.) Robert Goudie Macfarlane, M.B. (216350), from Emergency Commn., Nov. 29, 1941, and to be Capt., Nov. 29, 1942.

Lt. (War Subs. Capt.) Henry Edmund Douglas Flack, M.B. (70214), from T.A., Jan. 9, 1942, and to be Capt., Jan. 9, 1943.

Lt. (War Subs. Capt.) Stanley Eyre Large, M.B. (221345), from Emergency Commn., Jan. 10, 1942, and to be Capt., Jan. 10, 1943.

Lt. (War Subs. Capt.) Charles Leslie Johnston (223987), from Emergency Commn., Jan. 31, 1942, and to be Capt., Jan. 31, 1943.

Lt. (War Subs. Capt.) Edward Lewis Moore, M.C., M.B. (221846), from Emergency Commn., Jan. 31, 1942, and to be Capt., Jan. 31, 1943.

Lt. (War Subs. Capt.) Ivan Neal Shackleton Heald, M.B. (225719), from Emergency Commn., Feb. 21, 1942, and to be Capt., Feb. 21, 1943.

Lt. (War Subs. Capt.) Alfred Leigh Hardstaff Smith (227568), from Emergency Commn., Mar. 14, 1942, and to be Capt., Mar. 14, 1943.

Lt. (War Subs. Capt.) James Denis McAdorey (239139), from Emergency Commn., July 11, 1942, and to be Capt., July 11, 1943.

Lt. (War Subs. Capt.) Harold Dudley Grindley Hetherington, M.B. (246232), from Emergency Commn., Sept. 12, 1942, and to be Capt., Sept. 12, 1943.

November 14.—Major J. Cullenan, M.B. (8433), having attained the age for retirement is retained on the Active List supern. to establ. Nov. 12, 1944.

November 17.—Col. W. P. Croker, M.B. (8071), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to establ. Nov. 17, 1944.

Lt.-Col. C. Scales, M.C., M.B. (5164), from R.A.M.C., to be Col., Nov. 17, 1944, with seniority from July 10, 1941.

Major (War Subs. Lt.-Col.) T. W. Davidson, M.B. (26766), to be Lt.-Col. Nov. 17, 1944.

November 24.—Capt. J. S. Kelleher, M.B. (65316), to be Major, Oct. 2, 1944.

War Subs. Major T. F. Rodger, M.B., F.R.C.P. (127641), R.A.M.C., to be a Consultant and is granted the local rank of Brig., Oct. 29, 1944.

November 28.—Col. (acting Major-Gen.) N. Cantlie, M.C., M.B., F.R.C.S. (4217), late R.A.M.C., to be Major-Gen., Nov. 27, 1944.

Lt.-Col. Q. V. B. Wallace, O.B.E., M.C., M.B. (13873), from R.A.M.C., to be Col., Nov. 27, 1944, with seniority from Mar. 8, 1942.

Lt.-Col. F. C. Chandler, M.C., M.B. (15648), to be Col., Nov. 27, 1944, with seniority from Mar. 8, 1942.

Col. (temp. Brig.) J. Walker, C.B.E., M.C., M.B. (1310), late R.A.M.C., is granted the local rank of Major-Gen., Nov. 11, 1944.

Major-Gen. O. W. McSheehy, C.B., D.S.O., O.B.E., M.B., K.H.S. (15664), late R.A.M.C., having attained the age limit for retirement, is retained on the Active List supern. to establ., Nov. 27, 1944.

Col. E. W. Wade, D.S.O., O.B.E., M.D. (8131), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern. to establ., Nov. 27, 1944.

Major (War Subs. Lt.-Col.) K. Fletcher-Barrett, O.B.E., M.B., F.R.C.S. (27476), to be Lt.-Col., Nov. 27, 1944.

Major C. R. Christian, M.B. (27884), to be Lt.-Col., Nov. 27, 1944.

Major A. L. Stevenson, M.B. (5321), R.A.M.C. Res. of Offrs. reverts to ret, pay on ceasing to be employed, Nov. 15, 1944, and is restored to the rank of Col.

ARMY DENTAL CORPS.

November 21.—Major C. T. Hastings (15740) to be Lt.-Col. Sept., 2, 1944.

PRISONERS OF WAR AND MISSING.

Prisoners of War.

Lt.-Col. W. C. Alford, N.W. Europe.

Lt.-Col. E. Townsend, N.W. Europe.

Lt.-Col. D. H. Thompson, N.W. Europe.

Major R. R. Gordon, N.W. Europe.

Major T. R. B. Courtney, N.W. Europe.

Capt. R. E. Bonham-Carter, N.W. Europe.

Capt. S. L. Kaye, N.W. Europe.

Capt. J. H. Keesey, N.W. Europe.

Capt. S. R. Manson, N.W. Europe.

Capt. A. Percival, N.W. Europe.

Capt. J. Rutherford, N.W. Europe.

Capt. C. A. Simmons, N.W. Europe.

Capt. J. J. W. O'H. Tobin, N.W. Europe.

Capt. C. E. C. Wells, N.W. Europe.

Lieut. A. S. Barling, N.W. Europe.

Lieut. D. H. Randall, N.W. Europe.

Missing.

Major C. J. Longland, N.W. Europe.

Capt. W. I. S. Hudleston, N.W. Europe.

Capt. J. Lawson, N.W. Europe.

Capt. A. W. Lipmann-Kessel, N.W. Europe.

Capt. P. Smith, N.W. Europe.

Lieut. P. S. Allenby, N.W. Europe.

Lieut. D. E. Olliff, N.W. Europe.

DEATHS ON ACTIVE SERVICE.

Capt. T. J. Seavers. Died of wounds.

Capt. F. W. M. Greaves. Died of wounds.

Lt.-Col. J. O. Thomas. Died.

Capt. F. A. S. Austen. Died.

Lieut. D. M. de R. Winsor. Killed in action.

Capt. G. F. H. Drayson. Killed in action.

Capt. P. A. Robinson. Died of wounds.

Major A. Waymouth. Died.

Lieut. B. Brownscombe. Died of wounds.

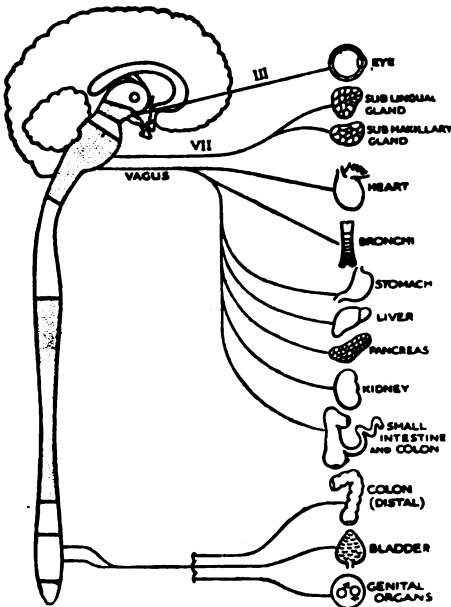
Capt. C. S. R. Lowdon. Killed in action.

Capt. P. S. Adler. Killed in action.

DEATH.

BARBOUR.—On Oct. 20, 1944, Major John Humphrey Barbour, M.B., R.A.M.C., Retired. Born Aug. 11, 1873, he took the M.B. of the Royal University of Ireland in 1900. Having been appointed a Civil Surgeon, Aug. 25, 1900, he was commissioned Lieut. R.A.M.C., Jan. 29, 1901. Promoted Captain Aug. 25, 1904, and Major Jan. 29, 1913, he retired March 3, 1923. He was a Fellow of the Linnean Society, London, and an Honorary Life Member of the St. John's Ambu-

lance Association. He served in South Africa in 1901 and 1902, taking part in the operations in Cape Colony and Orange River Colony and receiving the Queen's Medal with four Clasps. He served in France and Belgium from Aug. 21, 1914, till Dec. 10, 1919. Twice mentioned in despatches he was appointed a Commander of the Military Order of Avis and Officier, Ordre de l'Etoile Noire (France) and awarded the 1914 Star, British War and Victory Medals.



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References: (1) *Lancet*, 1, 575 (March 9, 1935); (2) *Zbl. Neurochir.*, 1942, No. 1/3.

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